3com

User Guide

Ethernet Client Bridge

3CWE820A
Wireless Network Solution

http://www.3com.com/
http://www.3com.com/productreg

Published March 2001
User Guide version 1.0.0

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1 Wireless Network Topologies

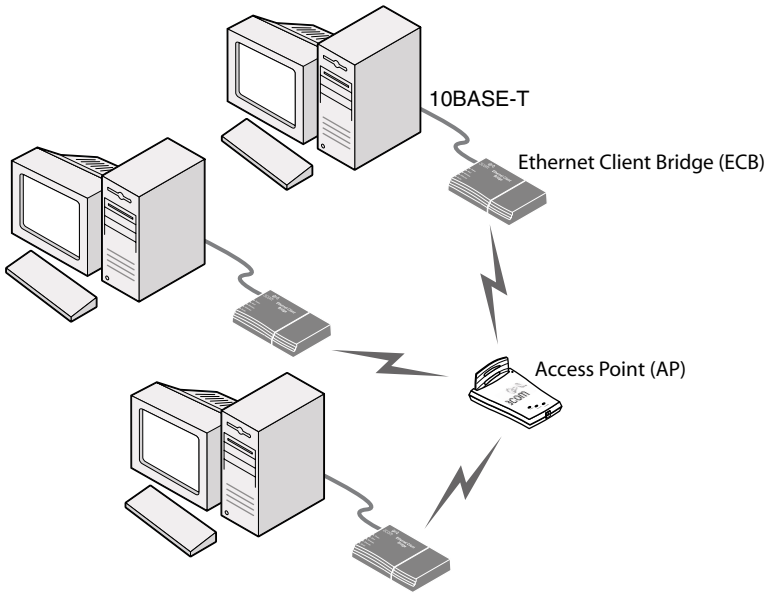
The 3Com Ethernet Client Bridge can be easily integrated into your existing wireless network, or multiple ECB units or other clients can be used to create a new wireless network. A wireless network, or wireless LAN, acts as an extension or alternative to a wired network within a building or campus. Data is transmitted and received using radio waves. In a wireless LAN environment, no cabling is needed between nodes for data communication. There are two topologies in which a 3Com ECB may be used: infrastructure, which requires an access point, and 802.11 Ad Hoc, which does not. A detailed description of each is provided below.

Infrastructure Topology

Infrastructure topology is the most commonly used of the two types available for use of your 3Com ECB. Infrastructure mode requires the use of a device called an access point (AP). The main function of the AP is to form a bridge between the wired LAN and wireless clients. The AP is capable of filtering high rate wired traffic and transmitting only those packets that are destined to radio clients. You might think of the AP as a hub between the wired network and the wireless LAN. In this mode, the AP is a dedicated device that is wired into the LAN backbone. The AP remains as a stationary part of the wireless LAN, unlike individual ECB units that can be physically moved throughout the wireless LAN. In this mode, the ECB stations synchronize communication with the AP. Individual ECB units do not communicate directly with each other. All communication between ECB units or between an ECB and a wired network client must go through the AP (Figure 1).

Infrastructure mode is often used in systems that have heavy network traffic and want to utilize the filtering capabilities of the AP.

Figure 1



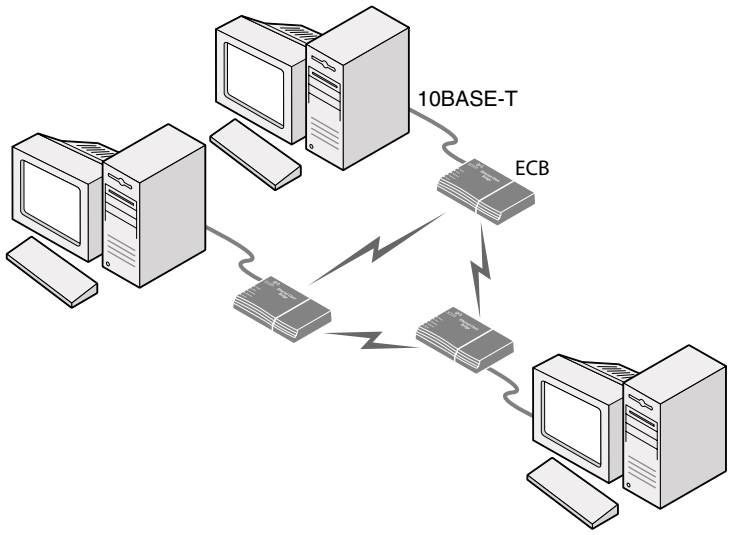
1 Wireless Network Topologies

The re-association capabilities of the IEEE 802.11 standard enable clients to move throughout the wireless LAN area and roam between access points. Re-association can occur as long as the ECB has the same ESSID (network name) as the AP to which it is trying to make a connection.

Ad Hoc Topology

The 802.11 Ad Hoc topology allows multiple ECB units to communicate directly with each other, without the need for an access point (AP) or other wireless infrastructure. Figure 2 shows a network in which four ECB units are used to provide wireless connectivity between Ethernet devices.

Figure 2



In this configuration, the ECB units make all three devices appear to be connected by the same Ethernet cable. Using ECB units in this manner provides a cost effective way to wirelessly link a small number of Ethernet devices. In addition, ECB units eliminate the need to install expansion cards or driver software.

NOTE: A single ECB is only capable of bridging for a single Ethernet device. A single ECB cannot be connected to a hub and bridge for multiple Ethernet devices on the hub.

2 Getting Started

This chapter describes the contents of the 3Com Ethernet Client Bridge package, the system requirements, a pre-configuration information sheet, and a configuration flowchart.

ECB Kit Contents

In your Ethernet Client Bridge package, you will find the following components:

- Ethernet Client Bridge
- RJ-45 Ethernet cable
- 5.2V Universal AC-to-DC power adapter
- AC Power cord
- DC Power cable
- Printed quick start guide
- *Installation* CD containing a user guide and configuration software
- Mounting hardware

If any of these items are missing or damaged, please contact the place of purchase or 3Com Customer Support (http://www.support.3com.com).

System Requirements

- One or more 3Com ECB units.
- One Wi-Fi-compliant wireless LAN PC Card for each ECB. For a list of supported PC Cards, visit the 3Com service and support Web site at http://www.support.3com.com.
- If the ECB will be used with an access point (AP), you will need an AP that either is compatible with the PC Card(s) being used, or is Wi-Fi compliant.
- Computer with Windows 95, 98, Windows 2000, Windows NT, or Linux with X11 Windows Manager and GTK installed.

Configuration Flowchart

Figure 3 shows the configuration steps for your ECB. Start at the top of the flowchart and move downward progressing toward a desired use of the ECB. As you move down the flowchart, the bulleted lists of configuration parameters you pass through are the parameters you need to set. There may be additional parameters that you can use to further control the behavior of the ECB for each application; however, only parameters that need to be modified for proper operation are listed in this chart.

Example 1 – For the ECB to act as an LPD Print Server, you will need to set the following parameters:

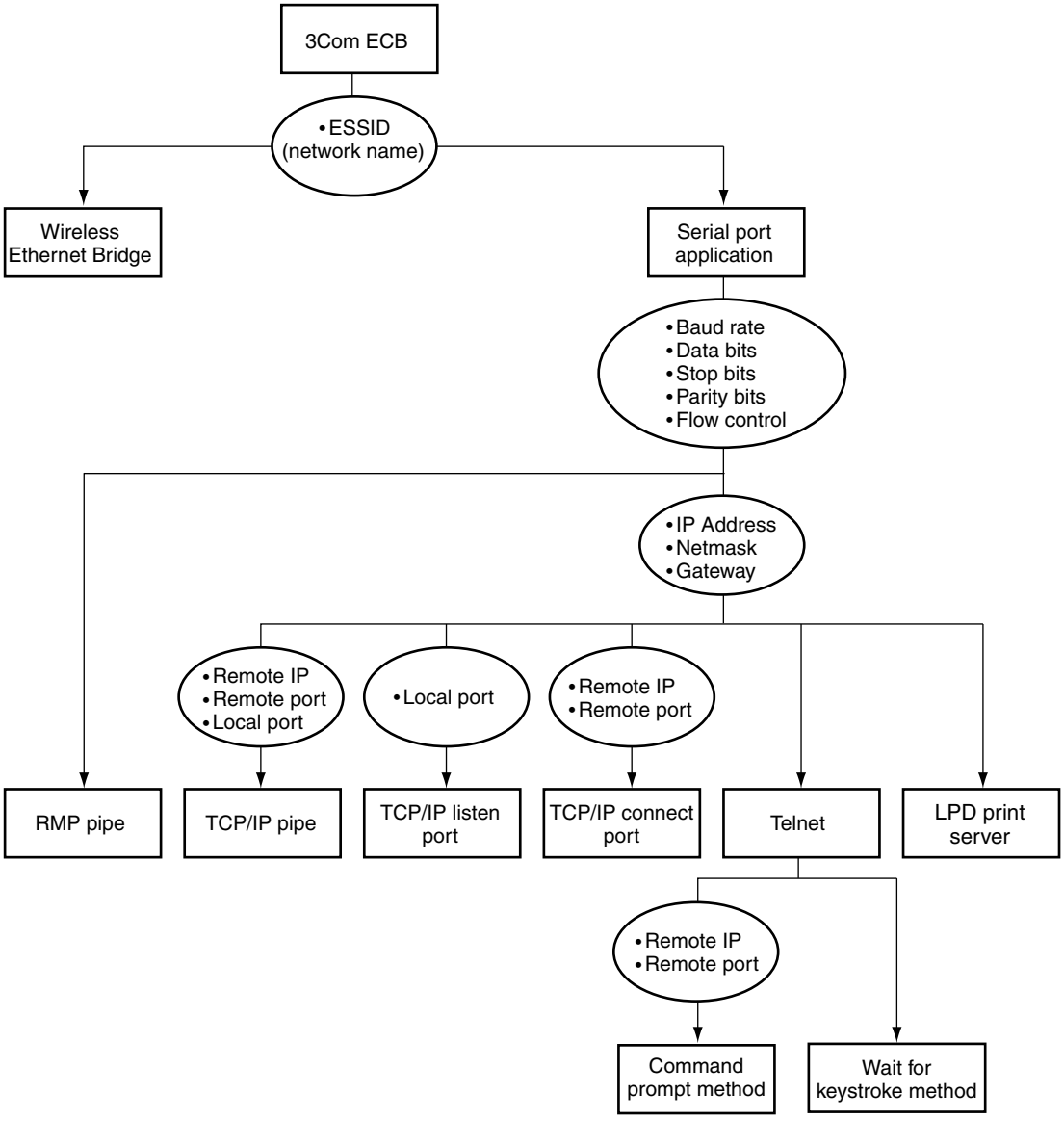
- ESSID (network name)
- Baud Rate
- Data Bits
- Stop Bits
- Parity Bits
- Flow Control
- IP Address
- Netmask
- Gateway

Example 2 - Wireless Ethernet Bridge

You need only set:

- ESSID (network name)

Figure 3



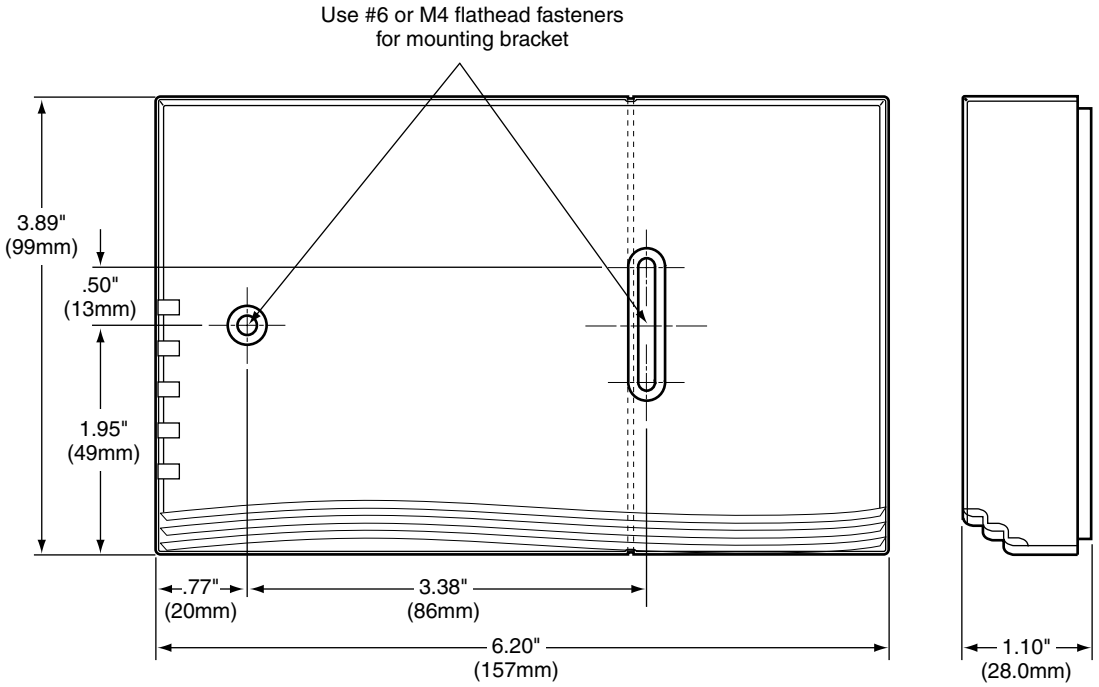
3 Installing the Hardware and Software

This chapter describes the physical dimensions of the ECB unit, the LED indicators, and hardware and software installation procedures.

Physical Dimensions

If you want to mount the ECB on a vertical surface, refer to the outside dimensions and mounting hole dimensions of the mounting plate shown in Figure 4. Primary dimensions are given in inches and secondary dimensions are in [mm].

Figure 4



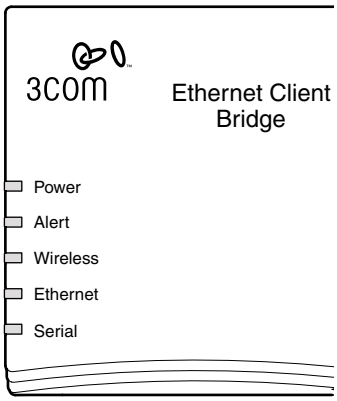
LED Indicators

As shown in Figure 5, there are five LED indicators:

- Power – Lights green when power is applied.
- Alert – Lights amber when status information is available.
- Wireless – Lights green when the PC Card is associated to another client and lights amber during radio communication.
- Ethernet – Lights green to show that a valid Ethernet link is present on the 10BASE-T port. Lights amber during Ethernet activity.
- Serial – Lights green when receiving data on the serial port and lights amber when transmitting data out the serial port.

3 Installing the Hardware and Software

Figure 5



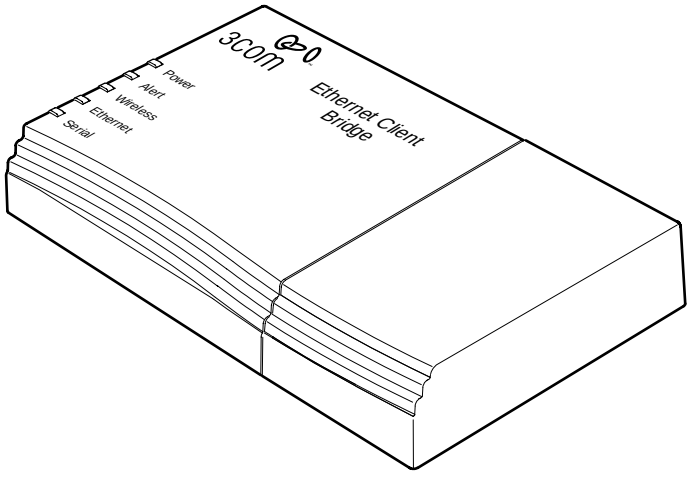
Installing the Hardware

This section will guide you through the hardware installation of the 3Com ECB including the installation of the wireless LAN PC Card. Please note that the user manual that accompanied your wireless LAN PC Card should be used in combination with this manual for many of the advanced configurations.

NOTE: The 3Com ECB does not include a wireless LAN PC Card. These cards are sold separately. Please see the 3Com Web site at www.support.3com.com for the most current list of 3Com PC Cards supported by your ECB.

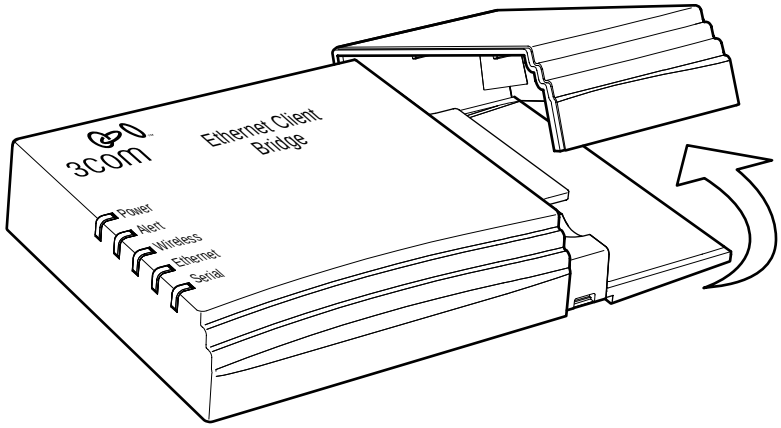
1 **Remove your ECB from the packaging. The ECB ships fully assembled (Figure 6). In order to install the radio and use the ECB, some disassembly and re-assembly is required.**

Figure 6



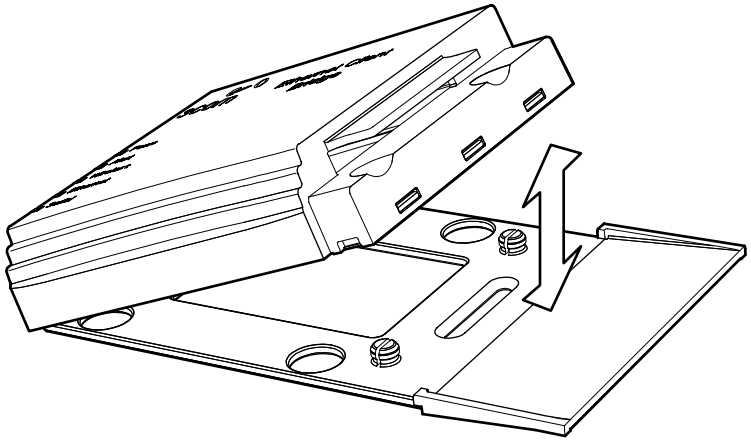
2 **Remove the cap from the ECB by pulling on the side of the cap to release it from the main ECB. Removal of the cap will reveal the PC Card slot (Figure 7).**

Figure 7



3 If you plan to mount the ECB on the wall or ceiling (optional), remove the bottom mounting plate (Figure 8). If using the ECB without mounting it, leave the mounting plate on the bottom of the ECB.

Figure 8



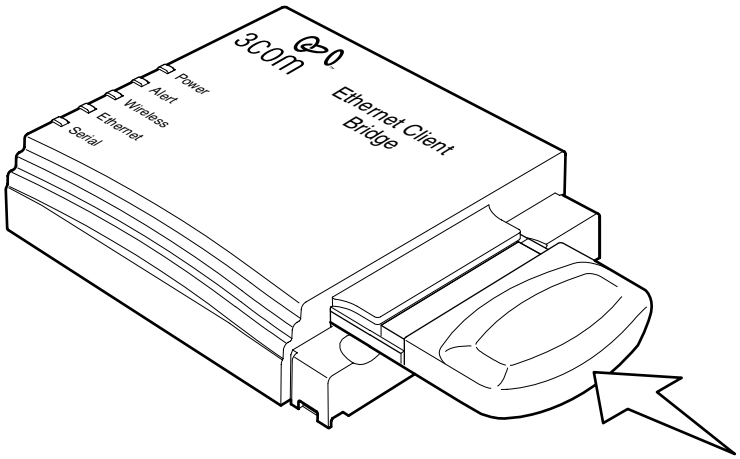
4 Remove the small combs from the cap.

NOTE: The combs are generally not needed, but when cut to an appropriate size, they can prevent the PC Card from vibrating out of the socket when the ECB is in an environment with extreme vibrations

5 Confirm that the ECB is not plugged in.

6 Gently insert PC Card face up into the designated slot. If you are uncertain, check the PC Card manual to determine the correct position of the PC Card for proper insertion (Figure 9).

Figure 9



7 **Replace the cap on the ECB that you removed in step 2 by snapping the cap straight down on the ECB body.**

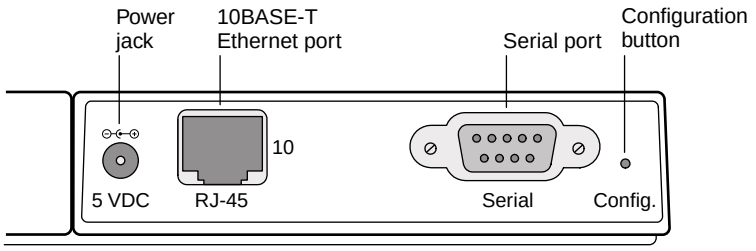
8 **If you are mounting the ECB, install the mounting plate where desired using the mounting hardware provided (see Figure 4 for physical dimensions of the mounting plate).**

9 **After securing the mounting plate to the desired location, attach the ECB onto the mounting plate.**

10 **Connect the six-pin DC power cable to the power adapter. Connect the AC power cord to the other side of the power adapter. Connect the round power plug to the ECB port labeled 5 VDC. Insert the AC power cord into the AC socket.**

11 **Connect a standard straight-through 10BASE-T Ethernet cable between the RJ-45 port on the ECB and the network port on the computer where you will install the ECB Configuration Utility software (see Figure 10 for ECB connectors).**

Figure 10



12 **Verify that the Ethernet LED is illuminated (Figure 5), indicating a valid Ethernet connection to your PC.**

13 **Your ECB hardware is now ready for configuration using the ECB Configuration Utility software. Proceed to "ECB Configuration Utility Software" below.**

ECB Configuration Utility Software

The ECB Configuration Utility software can be installed on a PC or workstation running either Windows 95, 98, Windows 2000, Windows NT, or Linux with X11 Windows Manager and GTK installed. This utility allows you to graphically and remotely:

- Display a list of ECB units running on the local network
- Display and edit the current configuration of any ECB
- Save and load configurations
- Update the ECB firmware

NOTE: The ECB Configuration Utility software communicates with the ECB using a non-routable protocol. This means that your ECB units must be accessible on the local Ethernet network in order to communicate with the ECB Configuration Utility.

In the event the Configuration Utility is not available, the Terminal Configurator is an alternative method that can be used to configure the ECB. See Appendix A for more information.

Windows

1. **Insert the *Installation* CD into the appropriate drive of your computer.**
   If the installation program does not begin automatically, click *My Computer* on your desktop. Click the icon for the drive in which the *Installation* CD is located, and then double-click *setup.exe*.
2. **The Welcome screen will appear first. Choose *Next* to continue the installation or *Cancel* to terminate.**
3. **The Software License screen appears. Choosing *Yes* indicates that you agree to the terms presented and will allow the continuation of installation. Choosing *No* will terminate the installation.**
4. **The Choose Destination screen appears next. This screen contains the default path and location for the ECB_Config.exe file. The default path is:**
   C:\Program Files\3Com\ECB_Config
5. **If you wish to use the default path, then continue to the next screen by clicking *Next*. You may choose another path and location for the ECB Configuration Utility that is more appropriate for your system. If you choose to do this, simply type the path into the field and continue by clicking *Next*.**
6. **The Select Program Folder screen will now appear. This screen allows you to change the name of the program folder that will be created. The default name is *ECB_Config*.**
7. **Click *Finish* to complete the installation of the ECB Configuration Utility software.**

The ECB Configuration Utility software is now installed and you are ready to configure your ECB.

Linux

1. **Ensure that X11 Windows Manager and GTK are installed on your system.**
2. **Copy the files located in the Linux directory on the *Installation* CD to a directory on your Linux machine.**
3. **Run the *ECB_Config* utility by typing *./ECB_Config* from the directory where you installed the files.**

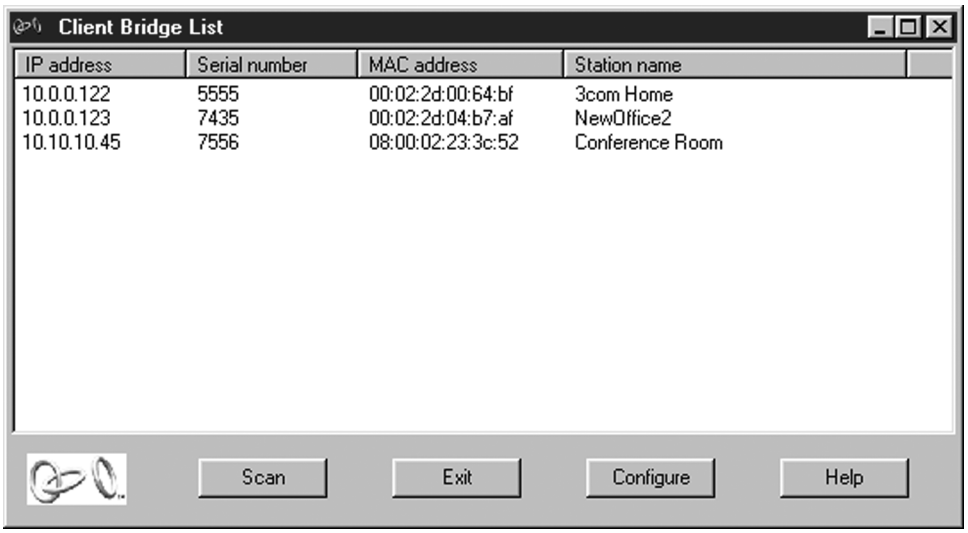
4 Configuration Utility Features

Client Bridge List Screen

The initial screen of the ECB Configuration Utility will display a list of the ECB units currently detected on the Ethernet. All ECB units can be accessed from this main screen. The buttons on this screen allow you to scan, exit, and configure a unit, and display the help page. The scan function allows you to perform a new search for active ECB units. After a scan is executed, any previously displayed ECB units that are no longer found will be removed from the list, and new ECB units will be displayed.

At the start-up of the ECB Configuration Utility, the program displays a list of available ECB units (Figure 11). Begin by highlighting the ECB that you wish to configure. Either click *Configure* or double-click the desired ECB listing.

Figure 11



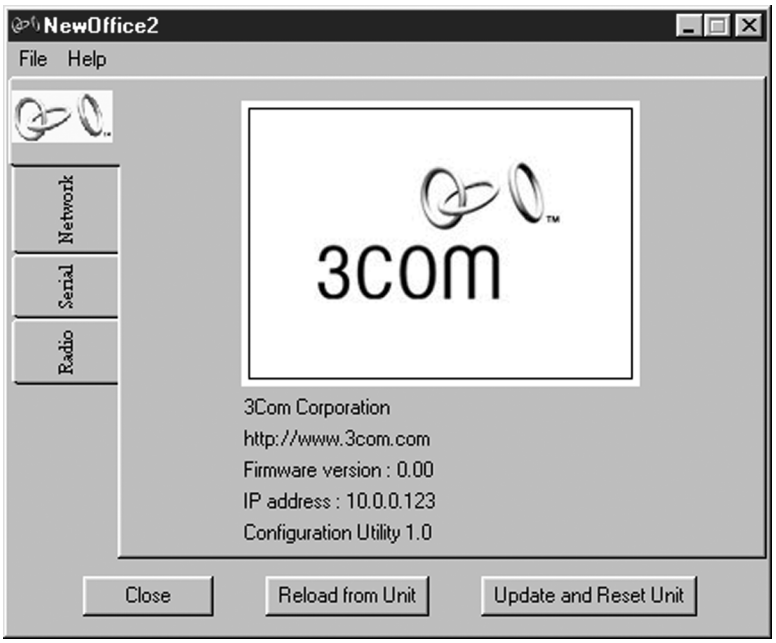
Configuration Screen

A configuration screen will appear displaying information about the ECB Configuration Utility and the selected unit (see Figure 12). The vertical tabs define the categories of configuration options. There are three tabs: Network, Serial, and Radio. Horizontal tabs expose different sub-categories described further within each specific section. There are three buttons at the bottom of the screen: *Close*, *Reload From Unit*, and *Update And Reset Unit*.

The *Close* button will close the current configuration screen. The *Update And Reset Unit* button uploads the parameters from the configuration utility to the ECB, and resets it so that the changes take effect. Before this is complete, a syntax check of all parameters occurs. If the check is not successful, an error message will appear in the GUI Message Log describing the errors and their location. The *Reload From Unit* button allows you to discard the changes you have made to the configuration and reload the current configuration from the ECB to the configuration utility.

4 Configuration Utility Features

Figure 12



The Configuration screen has a File menu that will allow you to:

- Save or load a configuration
- Reset the ECB to factory defaults
- Set a new password or clear it
- Access a view of the log files
- Update the ECB firmware.

Saving a Configuration

Using the ECB Configuration Utility, you can save the settings of the ECB to a local file. This feature allows you to restore settings to a known state or easily configure multiple ECB units with the same settings.

1 **Begin by clicking the *Update And Reset Unit* button. This will synchronize the parameters in the ECB with those in the configuration utility.**

NOTE: The saved parameter values are those currently in the configuration utility. To ensure you save your changes to both a local file and the ECB itself, you should always perform Step 1 and click *Update And Reset Unit* before saving your configuration.

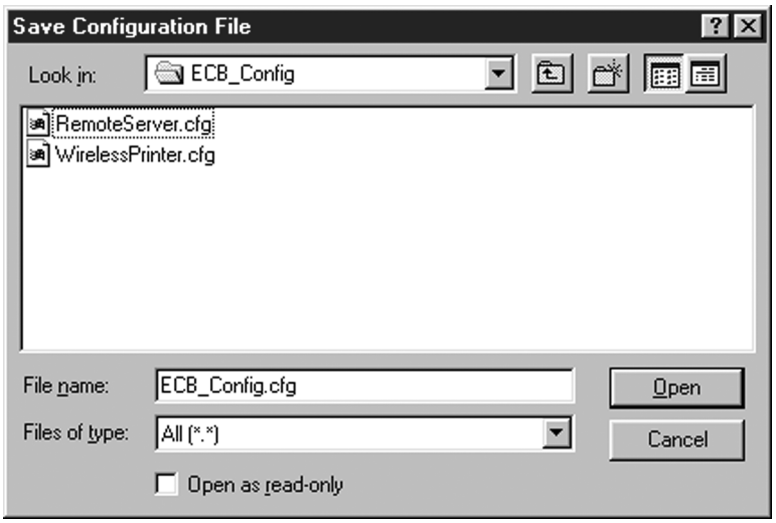
2 **Go to the *File* menu of the ECB Configuration Utility main screen.**

3 **Select *Save Configuration.***

4 **Use the dialog box (Figure 13) to navigate to the directory where you would like to save the current configuration. The default path is the ECB_Config program directory.**

5 **Click *Open*. (In this case, the *Open* button is used to save the file).**

Figure 13



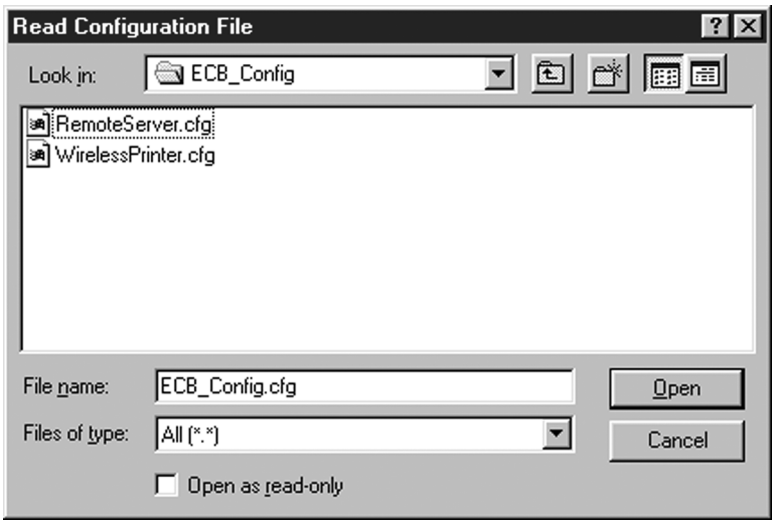
Loading a Configuration

The ECB Configuration Utility will allow you to easily reload a saved file to the currently selected ECB.

1. **Click on the *File* menu.**
2. **Select *Load Configuration*.**
3. **Use the dialog box (Figure 14) to navigate to the directory which contains the saved configuration you wish to upload.**
4. **Choose the desired configuration file and click *Open*. The loaded parameters will now be displayed in the configuration utility, but have not been uploaded to the ECB.**
5. **To activate the parameters, click *Update And Reset Unit*.**

NOTE: If the PC Card in the active ECB is different than the PC Card that was in the ECB when the configuration parameters were saved, all parameters but the radio options will be loaded from the file. You will need to set the new radio parameters manually. This procedure allows you to change your radio while keeping your network and serial settings. If you will continue to use this new radio type, you can save a new version of the configuration file so that future loads will include the radio parameter settings.

Figure 14

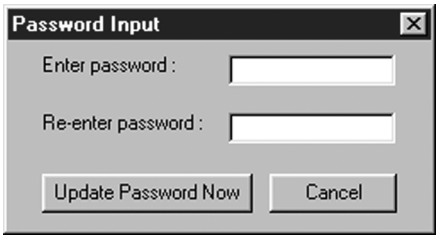


Changing the Password

Setting a password prevents unauthorized users from accessing or changing the settings on your ECB. You will need to enter this password each time you wish to reconfigure the ECB. It is recommended that you set a password for each ECB.

The selection *Set New Password* in the File menu lets you set or change a password on your ECB. A dialog box (Figure 15) will ask you to type the new password twice. Clicking *Update Password Now* will cause the new password to become immediately active. Entering blank text will remove the password. The utility will not prompt for a password when it is empty.

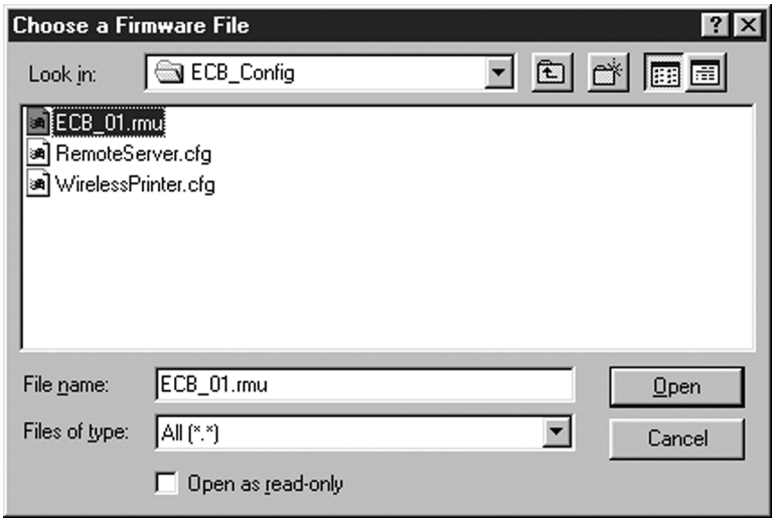
Figure 15



Updating ECB Firmware

1. **Begin by downloading the latest version of firmware from the 3Com Web site at www.support.3com.com to the computer that is currently running the ECB Configuration Utility. The firmware file will have the extension ".rmu".**
2. **After downloading the firmware, click *File* in the Main screen of the ECB Configuration Utility (Figure 12).**
3. **Select *Upload Firmware* from the options.**
4. **Use the file selector (Figure 16) to navigate to the location of the firmware file.**
5. **Double-click on the file. The Log Viewer will display a progress status. At the end of the process, your ECB will reset. The Log Viewer will announce that your ECB has been properly updated. The Alert light on the ECB will flash, and after about 15 to 20 seconds the new image will be fully installed and your ECB is ready for use.**

Figure 16



4 Configuration Utility Features

Resetting to Factory Defaults

1. **Begin by clicking *File* in the main screen of the ECB Configuration Utility (Figure 12).**
2. **Select *Reset To Factory Defaults*. All of the parameters will immediately be restored to the factory default values.**

Depending on your current radio network setting, resetting to factory default might leave your ECB in a non-reachable state. Resetting to defaults resets all parameters, including the ESSID (network name). If the ECB that was reset to the factory defaults is not on the same wired LAN section as your PC, it is possible that it will lose association to the access point, and the configuration utility will no longer be able to communicate with the ECB. If this happens, you will need to connect the ECB to your PC via an Ethernet cable. You will then be able to use the configuration utility to set the ESSID (network name) to that of your access point and the ECB will associate as desired.

If you are unable to access the ECB through the GUI, the following method can be used:

1. **Disconnect power to the ECB.**
2. **Insert one end of an extended paper clip into the small hole labeled *Config.* (located near the serial port on the ECB) to push the configuration button.**
3. **While keeping the configuration button pushed in, reconnect power to the ECB.**
4. **Keep the configuration button pushed in for at least five seconds after power is applied. The ECB will be reset to factory defaults after the five-second period.**

Changing Your Radio Type

The ECB Configuration Utility utility is designed to detect the type of PC Card you are currently using and to reset the specific radio parameters accordingly. Consequently, if you ever want to change your PC Card and retain the network and serial parameters of your previous PC Card, follow this procedure:

1. **With your current PC Card, follow the instructions for saving a configuration as described in "Saving a Configuration".**
2. **Remove power from the ECB, switch the PC Cards, and return power to the ECB.**
3. **Reset to factory defaults by following the instructions above.**
4. **Load the configuration you have just saved by following the loading instructions in "Loading a Configuration". All non-radio parameters will be retrieved.**
5. **Set the specific parameters of your new PC Card by following the instructions described in Chapter 5, *Configuration of Radio Settings*.**

Log Viewer

You can invoke the Log Viewer screen from the *File* menu of the main screen by selecting *Show Log Window.*

The Log Viewer has two main purposes:

- To display the different logs and tables stored on the ECB.
- To display status and error messages from the configuration utility.

In the upper left corner of the Log Viewer screen (Figure 17), there is a *File* menu from which you can switch views between the different ECB logs and the configuration utility messages.

Figure 17

GUI Message Log

The GUI Message Log displays status messages from the configuration utility.

Event Log

The event log displays messages generated by the ECB. Event log messages include basic information about the ECB hardware and any status messages generated by the ECB. To display the event log of your ECB, select *File* in the Log screen and select *Read Event Log* (Figure 17). To clear the entries from the event log, select *Clear Event Log* from the *File* menu.

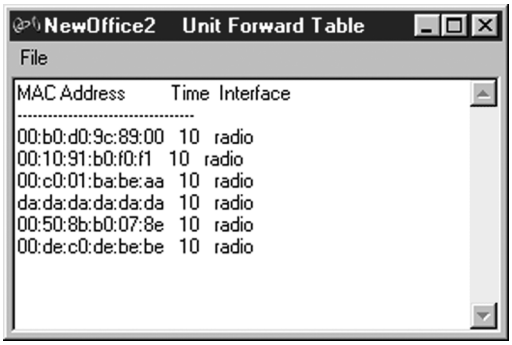
Association Log

The Association Log records association and disassociation events. Each association event is recorded with a timestamp and, if available, the access point MAC address and ESSID (network name). Each disassociation event contains only a timestamp. The timestamp indicates the number of 10 millisecond periods since the unit was turned on or reset. For example, a timestamp of 6000 corresponds to a time of 60 seconds, and a timestamp of 20 corresponds to a time of 0.2 seconds.

Forward Table

The Forward Table (Figure 18) displays the MAC addresses that have been seen by the ECB. The table lists the interface, wire, or PC Card, where each MAC address was observed. The time for each entry indicates the number of seconds until that entry is removed from the forwarding table.

Figure 18



5 Configuring Radio Settings

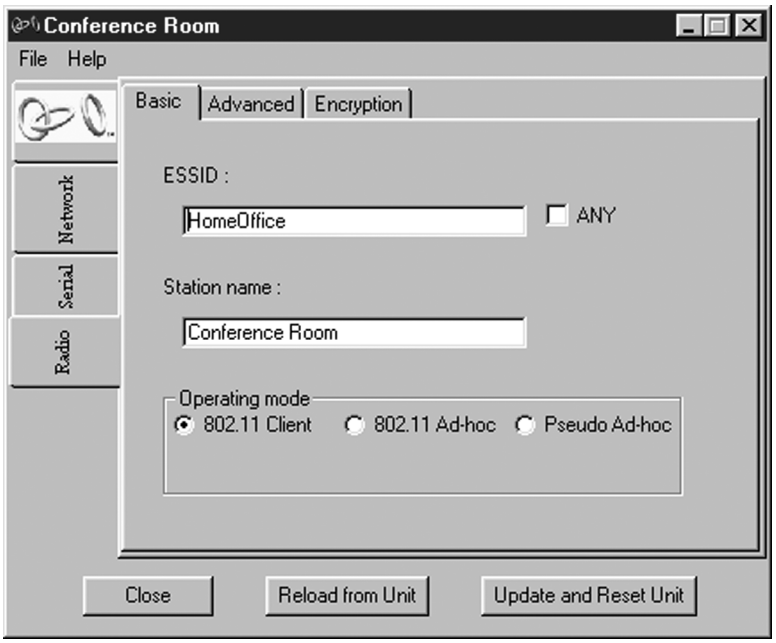
This chapter describes how to add a 3Com Ethernet Client Bridge to your wireless network and how to use encryption.

Basic Radio Configuration

1 **To begin configuration of the PC Card (radio) settings, open the configuration window for the desired ECB, as described in Chapter 4.**

2 **Click the *Radio* tab. New horizontal tabs appear: *Basic, Advanced*, and *Encryption* (Figure 19). The *Encryption* tab may not appear if this option is not supported by your PC Card.**

Figure 19



3 **Enter the ESSID (network name) which is set in your AP or which you will use to establish an ad hoc group. The ESSID is used to specify a unique IEEE 802.11 wireless network. Wireless ECB units use the ESSID to associate to a specific access point (AP). Only devices with the same ESSID will associate with each other. Alphanumeric values may be used in this field.**

4 **Enter the Station Name (client name). The station or client name is an arbitrary identifier for each ECB. The value supplied in this field is for convenience in identifying the ECB units with software such as the ECB Configuration Utility. It is recommended that you assign a meaningful client name to each ECB. Like ESSID, this field uses any alphanumeric combination.**

5 **Click *Update And Reset Unit*. The ECB Configuration Utility Message Log should appear with a message stating that the update was successful. When the ECB has joined your wireless network, the radio association LED will light green.**

5 Configuring Radio Settings

Advanced Radio Configuration

The Advanced Configuration screen is specific to the feature set of your wireless LAN card. Consult your PC Card user manual for appropriate settings. After configuration is complete, click *Update And Reset Unit*.

The MAC Address setting found on this tab is common to all PC Cards. This feature sets the MAC address used by the wireless LAN interface. The ECB can only bridge packets to or from this MAC address. There are four options: *Capture, Dynamic, Built-in*, and *Manual*. Table 1 lists the definitions of each option.

NOTE: Most users should use the default setting of *Capture*.

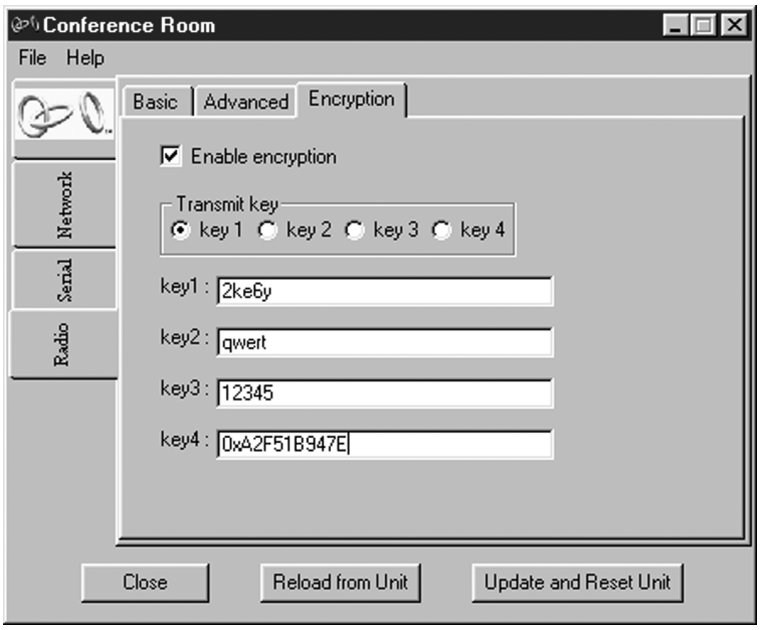
Table 1 Advanced Radio Configuration Settings

Setting	Effect	Usage
Capture	Every time the ECB is powered on, the ECB will capture its MAC address from the first packet it receives on the 10BASE-T Ethernet port. The ECB detects and uses the same MAC address as the device plugged into the 10BASE-T port. The ECB will use the previously captured MAC address upon power-on until the first packet is received on the 10BASE-T port.	Use *Capture* when the ECB is attached to the same device all the time (example: an Ethernet printer).
Dynamic	The ECB will change its MAC address each time the device plugged into the 10BASE-T port changes. The ECB detects the MAC address of the device plugged into the 10BASE-T port and uses that as its own. The ECB will use the built-in MAC address upon power-on until a packet is received on the 10BASE-T port.	Use *Dynamic* when you want to change the device that the ECB bridges for without requiring a power cycle of the ECB (example: public access gateway).
Built-in	The ECB will use the MAC address of the PCMCIA wireless LAN PC Card. This will prevent the ECB from bridging for any device on the 10BASE-T port.	Use *Built-in* when the ECB is used exclusively for serial port applications (example: network serial port without Ethernet bridging).
Manual	The ECB will use the MAC address specified by the user. The ECB will bridge traffic for a device with the specified MAC address.	The *Manual* setting should rarely be used. This setting is needed if the ECB is bridging to an Ethernet device that never generates any traffic.

Encryption

The *Encryption* tab may not appear if your wireless LAN PC Card does not support this option. Encryption is necessary to associate to an AP which is configured to deny unencrypted connections. Consult your PC Card manual for a description of how to set up encryption on your PC Card. In many cases, you will want encryption enabled to provide security for data being sent across the wireless part of your network.

Figure 20



The following is a general procedure for enabling this security feature.

1 **Click the *Encryption* tab (Figure 20).**

2 **Check the *Enable Encryption* box.**

3 **Enter up to four encryption key values.**
The values for the encryption keys may be written as either text (ASCII) strings or hexadecimal numbers. Hexadecimal values must be preceded by "0x" and are composed of the numbers 0 to 9 and the letters A-F. Text strings cannot begin with "0x".
The level of encryption corresponds to the length of the encryption key (Table 2). See your wireless LAN PC Card manual for the encryption levels supported by your PC Card.

Table 2 Encryption Level and Key Length Correspondence

	Key Length		
Encryption Level	**Hex**	**ASCII**	**Example**
40 bit or 64 bit	0x + 10 digits	5 characters	0xFEDCBA9876
128 bit	0x + 26 digits	13 characters	ALazyBrownDog

4 **Select a transmit key. The transmit key is the encryption key which will be used by the ECB to encrypt messages sent via the PC Card. Messages received by the PC Card will be decrypted if they were created using any of the four keys.**

5 **Click *Update And Reset Unit* at the bottom of the ECB Configuration Utility screen. If configured to run in infrastructure mode, the ECB should now associate to the access point with the specified ESSID (network name).**

6 Using the ECB as a Wireless Ethernet Bridge

The 3Com ECB can be used as a wireless Ethernet bridge for connecting a wired unit such as a computer or Ethernet printer to your wireless network. The ECB can act as a wireless Ethernet bridge in addition to performing any one of the serial port applications discussed in following chapters.

1. **Complete the Basic Radio Configuration instructions described in Chapter 5*, Configuration of Radio Settings*.**
2. **Click *Update And Reset Unit*.**
3. **If needed, move the ECB to the desired location. Provide power to the ECB and connect it to the Ethernet device for which it will bridge.**

Your 3Com ECB is now configured to act as a wireless Ethernet bridge to your Ethernet network component.

7 Configuring Network Settings

Network Configuration Settings

This chapter describes the network settings necessary to communicate with the ECB. Communication directly with the ECB will allow the following:

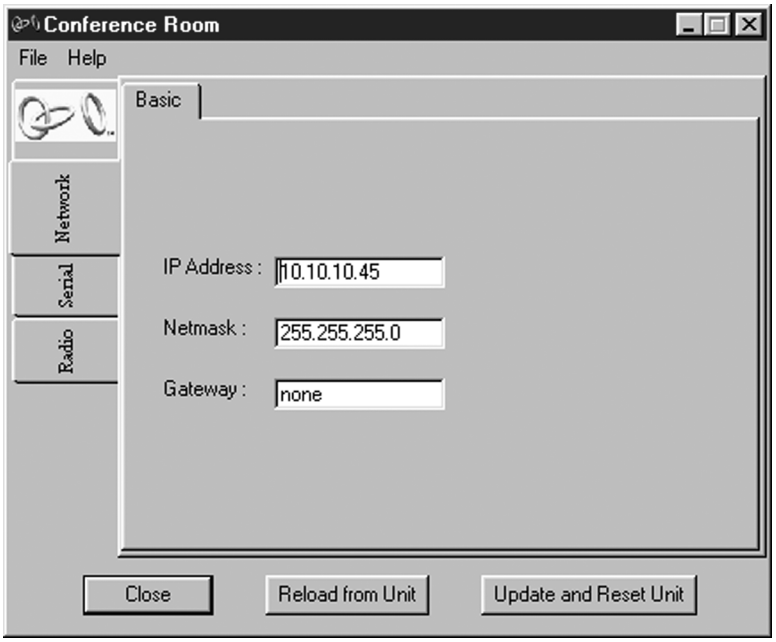
- Using the serial port applications described in the following chapters.
- Performing a network "ping" of the ECB.
- Remotely configuring the ECB via the Telnet protocol.

NOTE: "Bridging," as discussed in Chapter 6, is communication between the wireless interface and the Ethernet interface. Bridging does not communicate with the ECB and does not require setting the basic network parameters.

After completing the configuration of PC Card (radio) settings in Chapter 5, proceed with the following steps to configure the network settings.

1 **Click the *Network* Tab. Under the *Basic* tab, three fields are displayed as shown (Figure 21):**

Figure 21



2 **Enter the *IP Address* you wish to assign to the ECB. The IP address is the network address that will be used by other computers to communicate with the ECB.**

3 **Enter the *Netmask* value. This is a value that defines the range of IP addresses available within your local network.**

4 If your network uses a gateway (router or firewall), enter the IP address of the gateway. You will need to enter the IP address of your gateway if you plan to use the ECB to access computers or other ECB units beyond your Internet router or firewall. A gateway entry is only needed for serial applications that actively connect to an IP address outside your local area network. You may enter *none* in this field if no gateway is present or a gateway is not needed.

8 Configuring General Serial Settings

This chapter describes the general serial settings that are required for all serial port applications described in the following chapters. For proper operation, it is imperative that these settings of the 3Com ECB always match the settings of the device to which it is connected via the RS-232 port. There are two groups of parameters that need to be configured to accomplish this task: UART Settings and Flow Control Settings.

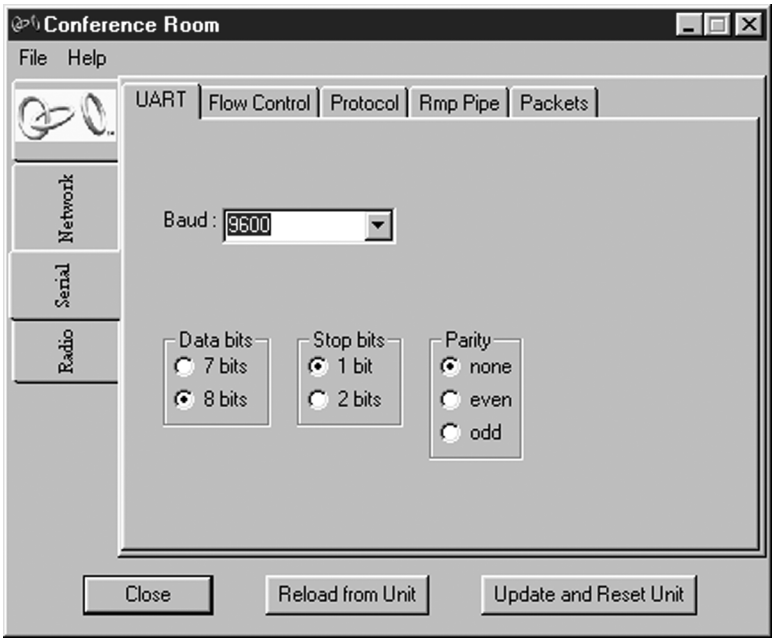
Configuring Universal Asynchronous Receiver/Transmitter (UART) Settings

A Universal Asynchronous Receiver/Transmitter (UART) is the fundamental hardware for serial communication, controlling the speed and method of data transfer of the serial port. To configure the UART, follow the steps below.

1 **Click the *Serial* tab.**

2 **Click the *UART* tab. Figure 22 displays the default settings for the UART.**

Figure 22



3 **Select the baud rate of your device from the pull-down menu. The baud rate indicates the data transfer rate of the serial port. The baud rate ranges from 300 to 115200 bits per second (bps). Standard rates are 300, 1200, 2400, 9600, 19200, 38400, 57600, 115200.**

4 **Determine the data bits setting of the device you are connecting to the ECB, then select the *Data Bits* setting for the ECB that matches the data bits setting of that device. The *Data Bits* setting determines the number of bits used to transmit data. The possible values are 7 and 8.**

5 **Determine the stop bits setting of the device you are connecting to the ECB, then select the *Stop Bits* setting on the ECB that matches the stop bits setting of that device. The *Stop Bits* setting determines the number of bits used to represent an end of a character. The value can be 1 or 2.**

6 **Determine the parity bit setting of the device you are connecting to the ECB, then select the *Parity Bit* setting on the ECB that matches the parity bit setting of that device. The *Parity Bit* setting is used to check for correct data transmission. Options are: none, even, and odd.**

Flow Control

Flow control is the process of adjusting the flow of data from one device to another to ensure that the receiving device can handle all of the incoming data. Flow control becomes an important factor when one of the devices is capable of transmitting data at a rate faster than the other can receive it. There are two basic types of flow control, hardware and software.

Hardware Flow Control

Hardware flow control uses dedicated signal lines to dictate transmission of data and has two options that allow you to select which pair of lines to use for this type of flow control:

- RTS/CTS = Request To Send/Clear To Send
- DTR/DSR = Data Terminal Ready/Data Set Ready

NOTE: The Windows *Hardware* flow control setting uses the RTS/CTS flow control lines.

Software Flow Control

Software flow control uses two special characters, called "Xon" and "Xoff", which are embedded in the data to turn on or off the transmission of data from the source to receiver.

In the incoming direction, flow control prevents the ECB from sending data when the computer is not ready to accept it. With incoming flow control on, the ECB will interpret Xon/Xoff characters in the data stream entering the serial port of the ECB as flow control signals. The Xon/Xoff characters are not considered data and therefore are absorbed by the ECB.

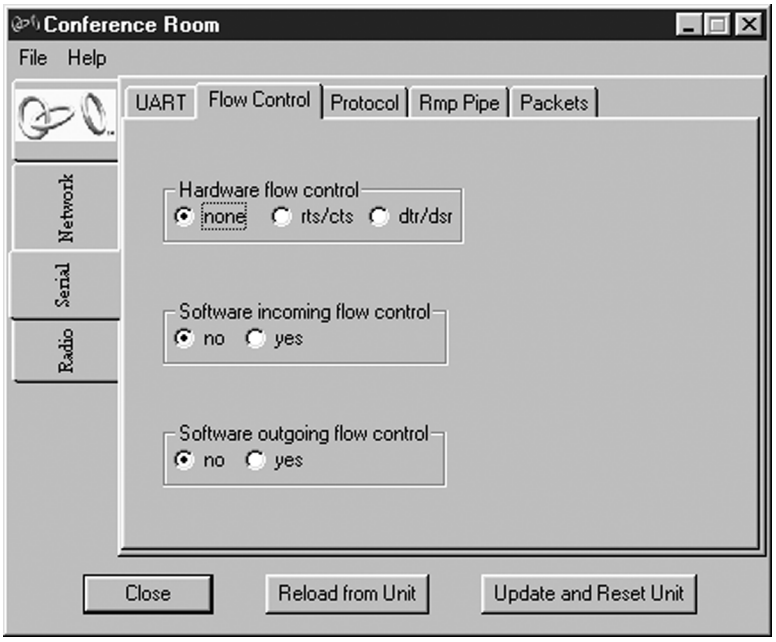
The outgoing software flow control option specifies the generation of Xon/Xoff flow control characters by the ECB. The control characters are sent out of the serial port of the ECB and instruct the computer to start or stop sending data. This option is used to prevent the computer from sending data when the ECB is not ready to accept it.

Software flow control can have both incoming and outgoing mechanisms running simultaneously, individually, or (default) not at all.

Configuring Flow Control

1 Click the *Flow Control* tab. Figure 23 shows the default settings.

Figure 23



2 Check the flow control settings of the device that you are connecting to the ECB. Change the ECB settings to match those of the connected device by clicking the corresponding buttons. Again, as with the UART settings, flow control only works when both devices are using the same settings. For example, if you are connecting to a device that is using RTS/CTS hardware flow control, set the ECB hardware flow control settings to RTS/CTS.

Serial Packets

The parameters under the *Packets* tab control the serial-to-network packet conversion process. Most users will not need to change the serial packet parameters. These parameters control the way that data received on the serial port is divided into Ethernet packets. The Ethernet packets are sent to a serial application network connection.

For specific information about the effects of the serial packet parameters, see Appendix B.

9 Configuring Wireless Printing to a Serial Printer

This chapter describes how to configure the 3Com ECB to enable wireless printing to a serial printer.

NOTE: If you have an Ethernet printer, this chapter does not apply. To connect to an Ethernet printer, follow the instructions for configuring a wireless Ethernet bridge in Chapter 6.

The LPD protocol requires an operating system (such as Windows and Linux) that supports LPD to a remote host. The LPD server on the ECB uses a uni-directional protocol wherein data is received via a network connection and sent out the serial port to the printer. Data received from the serial port is ignored. This means the ECB ignores data received from the printer except for software flow control characters (refer to "Software Flow Control" in Chapter 8).

NOTE: When configuring your operating system, use the network hostname or IP address of the ECB as the remote printer host.

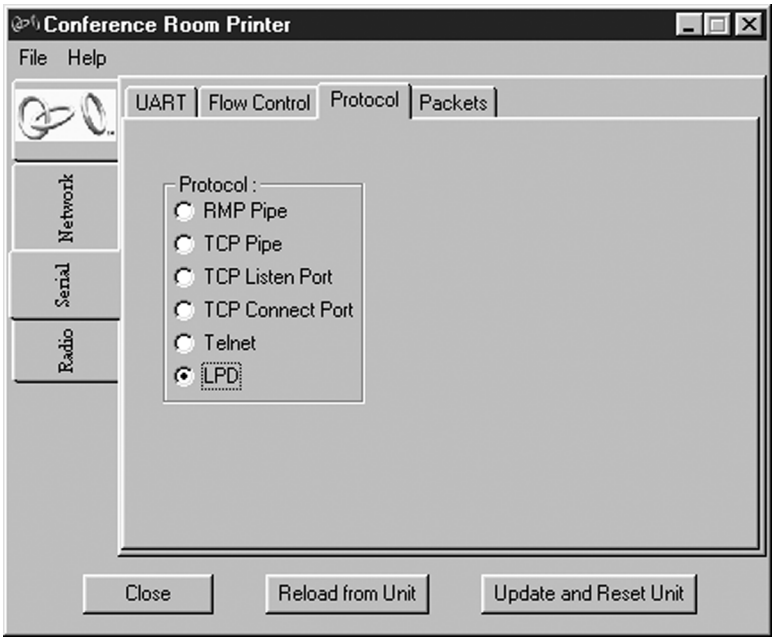
1 **Complete the Basic Radio Configuration instructions described in Chapter 5.**

2 **Complete the Network Configuration described in Chapter 7.**

3 **Complete the General Serial Configuration described in Chapter 8.**

4 **Click the *Serial* tab, and then select the *Protocol* tab as shown in Figure 24.**

Figure 24



5 **Click *LPD*.**

6 **Click the *Flow Control* tab (Figure 23). Verify that the flow control settings of your ECB match those of your printer.**

9 Configuring Wireless Printing to a Serial Printer

NOTE: If the flow control settings do not match, there will likely be errors when printing. Refer to your printer manual for information on how to configure flow control settings in your printer.

7 **Finish the configuration by clicking *Update And Reset Unit*. Your ECB is now configured to act as an LPD print server for your serial printer.**

10 Serial Line Replacement

Two 3Com ECBs are required to perform wireless serial line replacement. Serial line replacement can operate with the radio in either infrastructure or ad hoc mode.

When performing serial line replacement, data is exchanged using one of two protocols:

- RMP Pipe
- TCP Pipe

RMP Pipe is generally used in situations that require real-time or high-reliability data transfer. TCP Pipe is useful in situations where ECBs are moving in and out of range from each other. RMP Pipe is preferable for most serial line replacement applications.

RMP Pipe

For applications where an RS-232 serial cable is being replaced by a pair of ECB units or when ECB units are being used to form a broadcast topology, the RMP Pipe protocol should be used. In the RMP Pipe protocol, the ECB accepts a stream of data at its serial port and transmits it over the network to one or more receiving ECB units. When the data arrives at the receiving ECB, it is sent is out the serial port of that ECB.

The RMP Pipe protocol sends data to the receiving unit as though the ECB units were directly connected via serial cables. The data is not filtered or interpreted by either of the ECB units. This protocol is most useful if the ECB is to be used as a drop-in replacement for a serial cable.

The RMP Pipe protocol has several configuration options that are designed to optimize data throughput and minimize packet loss according to the needs of your particular system.

Configuring RMP Pipe

1 **Complete the Basic Radio Configuration instructions described in Chapter 5.**

NOTE: If you are replacing a serial line or serial network with two or more ECB units without using an access point, be sure your radio is using ad hoc mode.

2 **Complete the General Serial Configuration described in Chapter 8.**

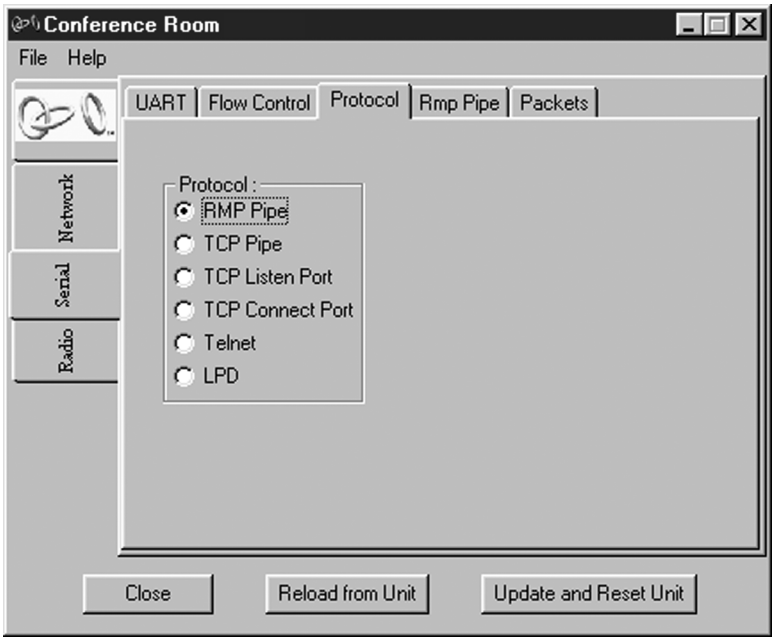
3 **Click the *Serial* tab, and then select the *Protocol* tab as shown in Figure 25.**

4 **Select *RMP Pipe*.**

5 **Click the *RMP Pipe* tab.**

6 **Configure the RMP pipe parameters using the following section as a guide.**

Figure 25



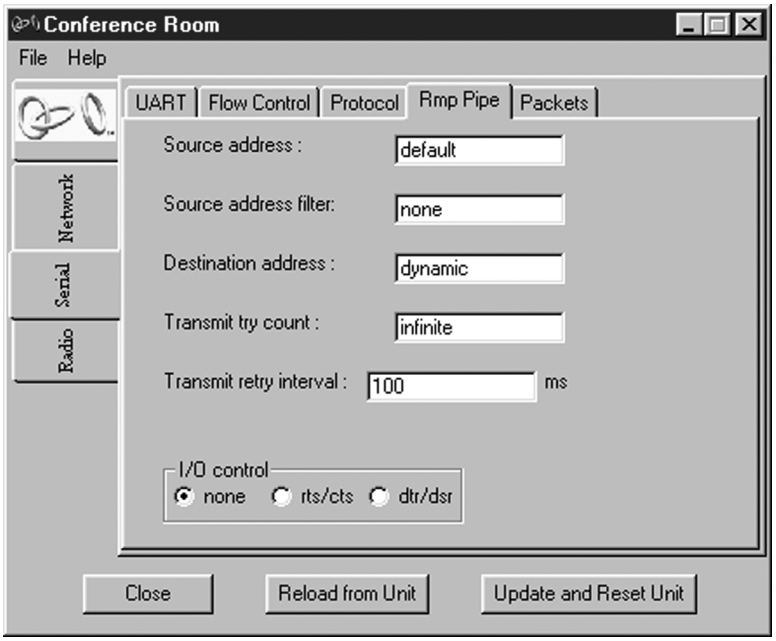
In environments where there are only two ECB units being used, you do not need to change these settings from their default values. The default values allow two units to automatically detect each other and establish a connection.

RMP Pipe Parameters

The defaults for the following RMP Pipe parameters are shown in Figure 26.

- **Source Address** – This is the RMP address the ECB uses to identify itself when sending serial data to another ECB. A value of *default* will cause the ECB to use its unique serial number as the RMP address. It is unlikely you will need to change this setting.
- **Source Address Filter** – Setting this value will tell the ECB to accept data coming only from the specified address. For example, if this entry is set to *1234*, only data originating from a ECB with the RMP address of *1234* will be accepted. All other data will be ignored. The value *none* allows data from any RMP address to be accepted. The Source Address Filter value needs to be changed only if you have multiple RMP passthrough serial line replacement installations in close proximity.
- **Destination Address** – This address tells the ECB where to send data received on the serial port. You may enter the RMP address of another ECB for direct serial line replacement. Other possible values are *dynamic* or *broadcast*. Entering *dynamic* causes data to be sent to the ECB from which the unit last received data. Using the value of *dynamic* is an easy way to allow two ECB units that are by themselves to communicate to each other. Entering *broadcast* causes the data to be sent to all ECB devices that are set to use RMP Pipe.

Figure 26



- **Transmit Try Count** – For non-broadcast data, this count specifies the number of attempts that the ECB should make in transmitting each RMP packet of data. A transmission attempt may fail if the destination ECB is out of range or turned off. When this happens, the data will be lost if retry attempts are not made, or are not successful. The Transmit Try Count gives the user the ability to tell the ECB how diligently to attempt transmission of data. Note that subsequent RMP data transmissions are delayed until the packet being retried is successfully sent, or the maximum try count is reached. The maximum count is 65,000 times. The default value is *infinite*, which causes each packet to be retried until successfully sent. Select the Transmit Try Count based on the sensitivity of your application to data delay and/or data loss (Table 3):

Table 3 Transmit Try Count Setting

Application Sensitivity	Transmit Try Count Setting
Sensitive to data delay	Low transmit try count
Sensitive to data loss	High transmit try count

- **Transmit Retry Interval** – When making additional transmit attempts as specified with Transmit Try Count above, it is necessary to specify how long to wait between successive retry attempts. This setting determines the time period between retransmission attempts. The value is specified in 1/100ths of a second, so that a value of 100 means 1 second. The maximum value is 65000. The default value is 100.

10 Serial Line Replacement

I/O Control

I/O control is only relevant to serial line replacement applications that use the RMP protocol. I/O control defines control over digital inputs and outputs of the ECB separately from the data lines. Digital input and output are shared with the flow control lines (RTS, DTR, CTS, and DSR), but in this mode the ECB does not interpret them as flow control signals. They give the ability to send digital data from one device to another without interpretation by the ECB units themselves. When a ECB detects a change in one of its RTS or DTR lines, it will cause the opposite ECB to immediately change the state of its corresponding CTS or DSR line to match.

NOTE: You cannot use hardware flow control on lines that have been enabled for I/O Control.

TCP Pipe

TCP Pipe, like RMP Pipe, makes no changes to the serial data stream. TCP Pipe differs from RMP Pipe in that it creates two independent TCP/IP network connections for transmitted and received data. Using two connections allows each ECB to detect conditions when it has lost radio contact with the opposite unit, as can occur in environments with mobile units.

Configuring TCP Pipe

In this configuration, each ECB unit simultaneously acts as a client and a server.

1 **Complete the Basic Radio settings as described in Chapter 5.**

NOTE: If you are replacing a serial line or serial network with two or more ECB units without using an access point, be sure your radio is using ad hoc mode.

2 **Complete the Network Configuration described in Chapter 7.**

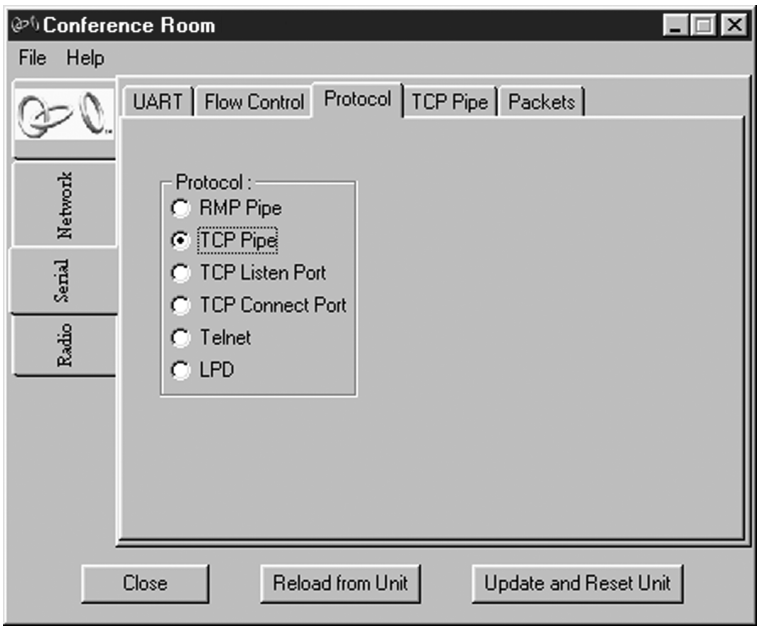
3 **Complete the General Serial Configuration described in Chapter 8.**

4 **Click the *Serial* tab.**

5 **Select the *Protocol* tab.**

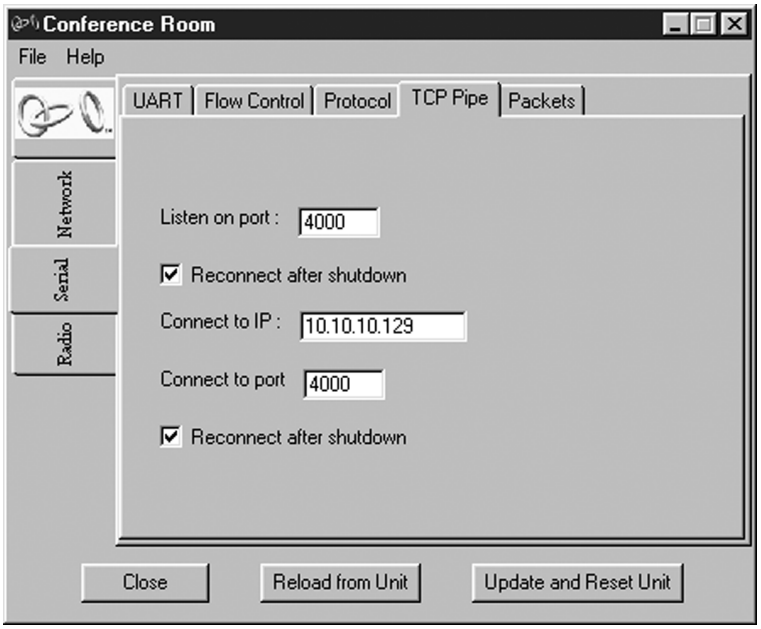
6 **Select *TCP Pipe* (Figure 27).**

Figure 27



7 Click the *TCP Pipe* tab (Figure 28).

Figure 28



8 Set the *Listen on port* number for each unit to match the *Connect to port* number of the opposite unit. The defaults for both of these ports are set to 4000 ensuring a correct configuration if both ECBs are left at the default value.

9 Enter the IP address of the opposite unit in the *Connect to IP* field.
There are two*Reconnect after shutdown* check boxes (which are checked by default) for both the listening port and connecting port numbers. This feature allows the ECB units to re-establish communication after one of the ECB units has lost communication with the other. For example, if one of the ECB units is power-cycled or loses radio communication for a time, the unit will reconnect only if this feature is enabled.

10 Click *Update And Reset Unit*.

11 Configuring the ECB as a Network Serial Port

Connection to a network serial port is accomplished over a TCP/IP socket connection. Any program that uses standard TCP/IP network sockets may be used to communicate with the serial port of the ECB. Once a socket is established to the ECB, any data written to the socket will be sent out the serial port of the ECB. At the same time, any data received by the serial port of the ECB will be returned via the socket connection.

The ECB network serial port may be used in two modes:

- TCP Listen Port
- TCP Connect Port

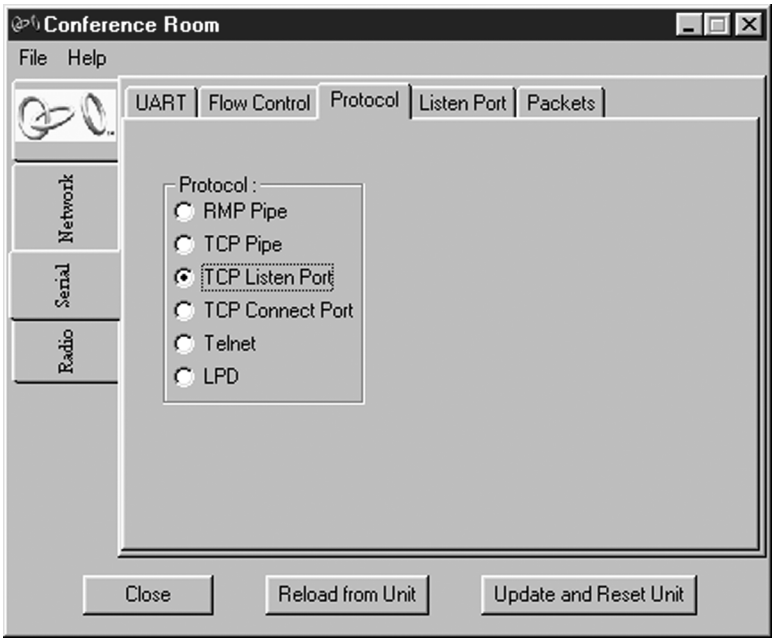
In the TCP Listen Port mode, the ECB waits for a TCP/IP socket connection to be made by the network program with which it will communicate. TCP Listen Port mode should be used if you have a central server that expects to open a TCP/IP socket connection to the ECB.

In the TCP Connect Port mode, the ECB will establish a socket connection to the IP address and port number specified in the configuration. TCP Connect Port mode should be used if your system expects the ECB to open a TCP/IP socket connection to a central server

To configure your ECB as a network serial port, begin by following the steps below.

1. **Complete the configuration of the Basic Radio settings as described in Chapter 5.**
2. **Complete the Network Configuration described in Chapter 7.**
3. **Complete the General Serial Configuration described in Chapter 8.**
4. **Click the *Serial* tab, and then select the *Protocol* tab. *TCP Listen Port* and *TCP Connect Port* will appear among the protocol choices displayed (Figure 29). Continue following the instructions below for the mode of your choice.**

Figure 29



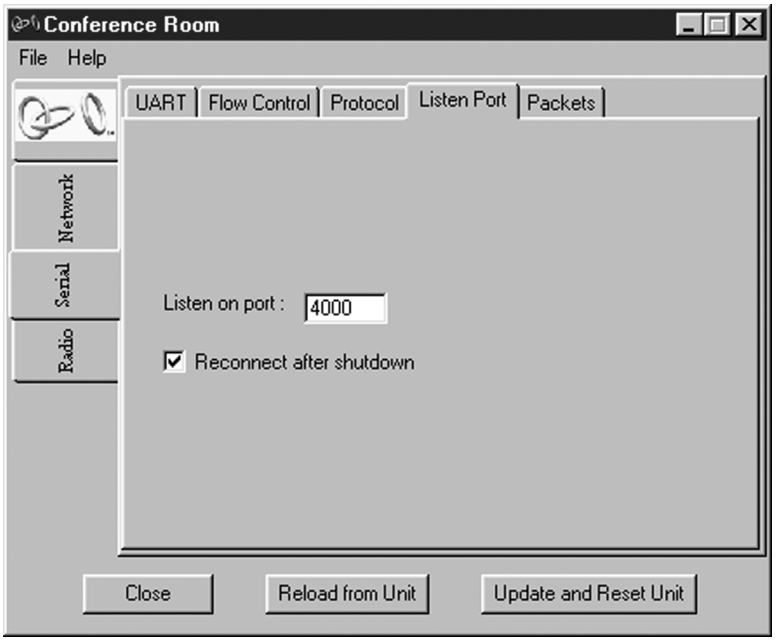
11 Configuring the ECB as a Network Serial Port

TCP Listen Port

Complete the configuration described in steps 1–4 at the beginning of this chapter and then follow the steps below:

1. **Click *TCP Listen Port* from the *Protocol* list (Figure 29)**
2. **Click the *Listen* tab (Figure 30).**
3. **Type the port number on which the ECB will listen for a connection. This is the port number that your program will use to connect to that ECB. The default is 4000.**
4. **For most applications, leave the *Reconnect After Shutdown* box checked. Checking this box causes the ECB to listen for and accept a new connection if the active one closes.**
5. **Click *Update And Reset Unit*.**

Figure 30

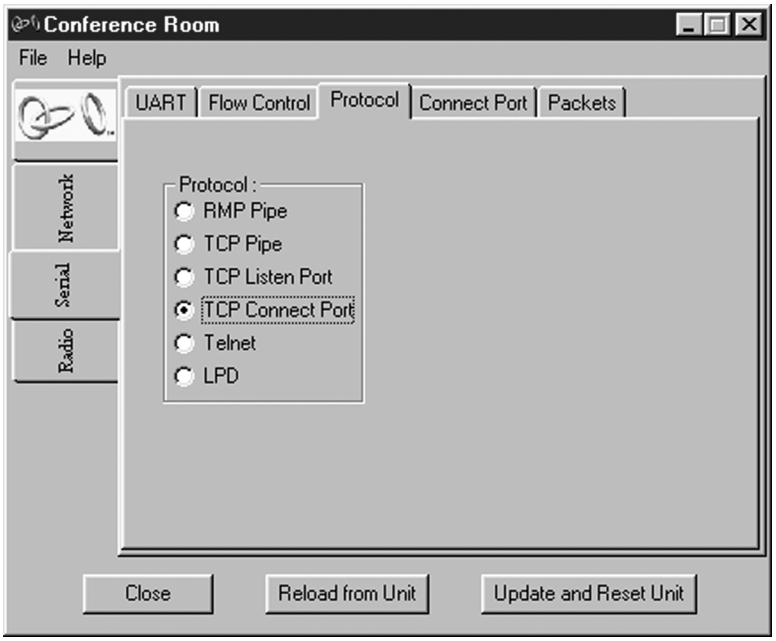


TCP Connect Port

Complete the configuration described in steps 1–4 at the beginning of this chapter, and then follow the steps below:

1 **Click *TCP Connect Port* from the *Protocol* tab list (Figure 31).**

Figure 31



2 **Click the *Connect Port* tab (Figure 32).**

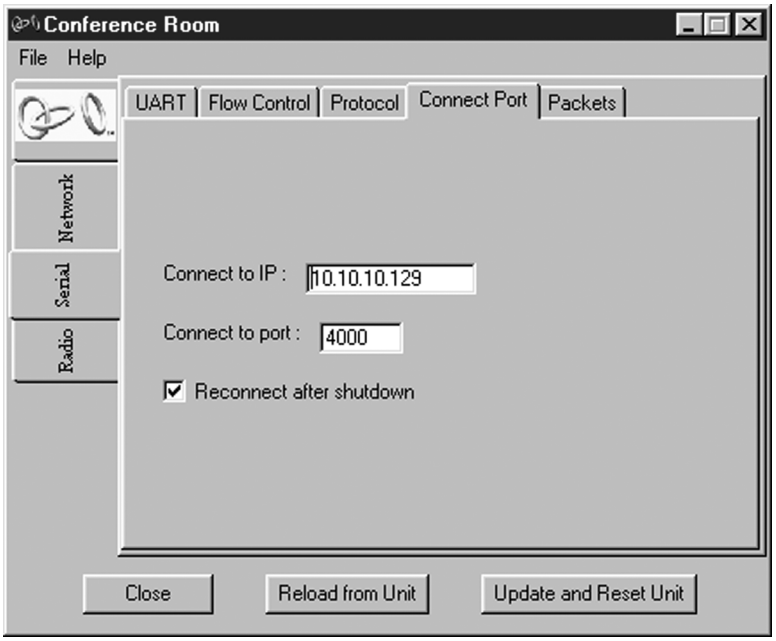
3 **In the *Connect to IP* field, enter the IP address of the device that the ECB is connecting to.**

4 **In the *Connect to Port* field, type the port number to which the ECB will connect. The default is 4000.**

5 **For most applications, leave the *Reconnect After Shutdown* box checked. Checking this box causes the ECB to re-initiate a new connection if the active one closes.**

6 **Click *Update And Reset Unit*.**

Figure 32


Conference Room
File Help
UART
Flow Control
Protocol
Connect Port
Packets
Network
Serial
Radio
Connect to IP :
10.10.10.129
Connect to port :
4000
Reconnect after shutdown
Close
Reload from Unit
Update and Reset Unit

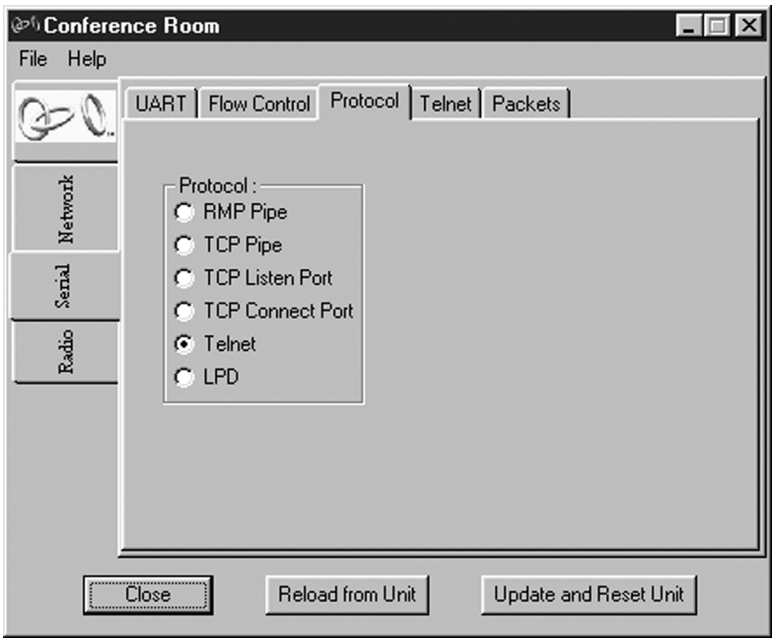
12 Configuring the ECB as a Serial Telnet Client

This chapter describes how to configure your 3Com ECB as a serial Telnet client. Telnet is a method to connect and remotely log-in to a host computer or network device. The host computer or device must be running a Telnet server for this service to be available. Once the Telnet session is established from the ECB, any data received by the serial port of the ECB is sent to the host. At the same time, any data returned from the host is sent out the serial port of the ECB. Typically, the serial port of the ECB is connected to a serial terminal or a computer that is running terminal emulation software, such as Windows Hyperterminal.

To configure your ECB as a serial Telnet client, begin by following the steps below:

1. **Complete the Basic Radio Configuration instructions described in Chapter 5.**
2. **Complete the Network Configuration described in Chapter 7.**
3. **Complete the General Serial Configuration described in Chapter 8.**
4. **Click the *Serial* tab, and then select the *Protocol* tab (see Figure 33).**
5. **Select *Telnet* in the *Protocol* list.**
6. **Click the *Telnet* tab at the top of the panel. There are two methods that can be used to establish a Telnet connection, *wait for keystroke* and *command prompt*. The next two sections describe these methods and the configuration necessary for each.**

Figure 33



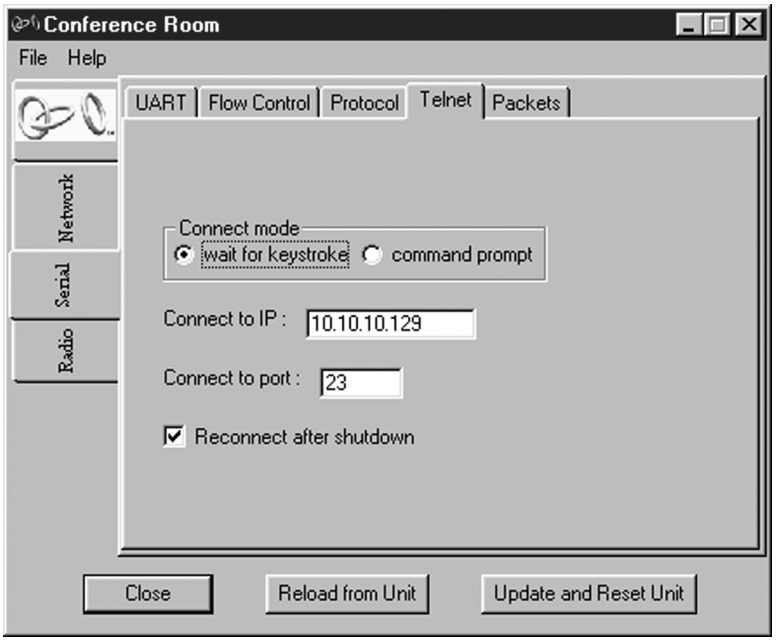
Wait for Keystroke Connection

The wait for keystroke connection method establishes a connection to a specific Telnet host when the user presses a key on the Telnet terminal window. When the Telnet connection is closed, the ECB will wait for a keystroke to connect again.

To configure your ECB as a serial Telnet client using the wait for keystroke connection method, follow steps 1–6 at the beginning of this chapter and then complete the steps below:

1. **Click *wait for keystroke* (Figure 34).**
2. **In the *Connect to IP* field, enter the IP address of the device to which the ECB will establish a Telnet connection.**
3. **The default *Connect to Port* value, 23, is the industry standard port number for Telnet connections. It is unlikely you will ever need to change this setting.**
4. **Leave the *Reconnect After Shutdown* box checked to allow a new session after closing an active one.**
5. **Click *Update And Reset Unit*.**

Figure 34



Command Prompt Connection

The command prompt connection method provides a "Telnet prompt" to the serial terminal. From the Telnet prompt, a user can open a Telnet session to any computer or device that is accessible on the network and is capable of accepting Telnet connections.

To establish a Telnet connection from the terminal emulator software, type the command *open* followed by the IP address of the host computer or device. The IP address may optionally be followed by the TCP port number on which to open the connection. If the port number is omitted, the industry-standard default Telnet port number of 23 is used.

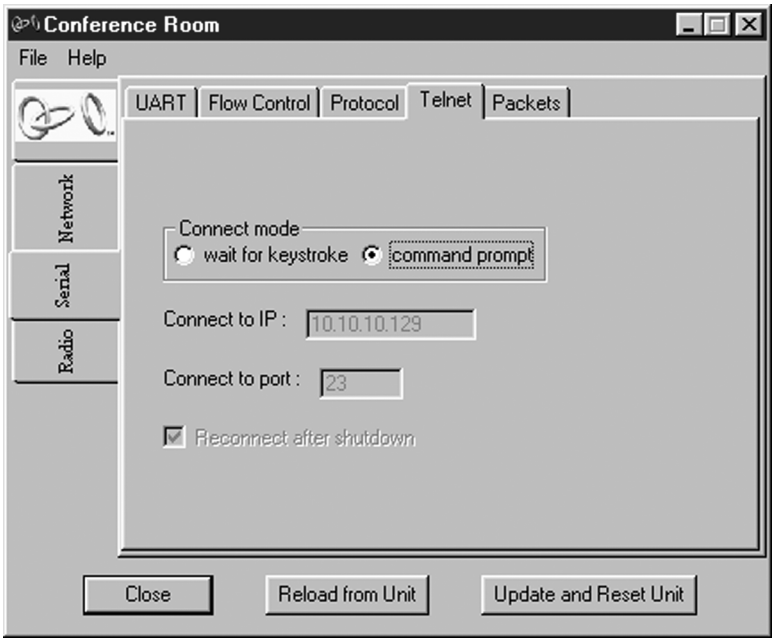
NOTE: You must use the IP address and not the name of the host since only IP addresses are recognized by the ECB. You can usually determine the IP address of a host by pinging its host name.

When the Telnet connection is closed, the ECB will present a new Telnet prompt.

To configure your ECB as a serial Telnet client using the command prompt connection method, follow steps 1–6 at the beginning of this chapter and then complete the steps below:

1. **Click *command prompt* (Figure 35).**
2. **Click *Update And Reset Unit*.**

Figure 35



13 Troubleshooting

If your 3Com ECB is not operating properly, please make sure the ECB is running the latest firmware, and use this guide before contacting 3Com Customer Support.

Firmware Updates

Firmware updates can be found at the 3Com Customer Support Web site: http://www.support.3com.com

Problem Diagnosis

Table 4 Problem Diagnosis

Problem	Solution
Power light is off or the power light is blinking.	The ECB is not receiving power properly. Verify that all physical connections are securely in place. Contact Customer Support if the problem persists.
Alert light is on.	Configuration or software alert condition. Check the System Event Log to determine the cause, and refer to Section 13.2, Event Log Error Table for details. Use the Clear Event Log option to clear the event log and turn off the status light.
ECB is connected to an Ethernet cable, but the Ethernet Link Light is not lit.	Invalid connection to Ethernet. Verify that both ends of the cable are plugged in securely. If the ECB is attached to a hub, a crossover Ethernet cable must be used. If the ECB is attached directly to an Ethernet device (i.e., a PC or Ethernet printer), it must be a straight-through cable. Verify that you are using the correct cable. If you are using the correct cable, verify that you are connecting the ECB to a 10BASE-T Ethernet device. The ECB does not support 100BASE-T.
Wireless light is off and the Alert light is off.	The PC Card is not linking to the access point. Verify that the ESSID is set to match the access point ESSID. Verify that the PC Card is fully inserted in the socket.

13 Troubleshooting

Event Log Error

Table 5 lists event log errors. All entries in the event log are preceded by a number. This number is a timestamp used by Customer Support, but is not relevant to looking up items in Table 5.

Table 5 Event Error Log

Error Code	Description
UART Error – No Rx Buffer Available	Data is being sent to the UART at a rate faster than it can clear its receive buffers, and data is being lost. Enable flow control for your serial application. Note that if you are using the serial port menu system for configuration, flow control will not be enabled in the ECB. To avoid getting this error while in the serial port configuration system, simply type slower.
FLASH failure. Unable to read or write configuration.	FLASH may be damaged. Configuration cannot be accessed or saved. Contact 3Com Customer Support.
Initialization of interface "lan0" failed.	PC Card could not be initialized. Try each of the following steps in order. If any of these steps succeed, there is no need to perform any of the later steps; otherwise continue to the next step. **1** Reset the ECB. **2** Unplug the power, wait for approximately 30 seconds and then reapply power. **3** Reset the ECB to the factory default configuration and reset the ECB. **4** Contact 3Com Customer Support if the problem persists.

A Terminal Configurator

The Terminal Configurator is an alternate method that can be used to configure your 3Com ECB. It can be used in the event that the ECB Configuration Utility (Chapter 3) is not available. The Terminal Configurator is a text-based configuration method that lacks many of the features of the Configuration Utility. The Terminal Configurator can be accessed in two ways.

The Terminal Configurator can be used via a *direct serial connection*. When using a direct serial connection, the ECB communicates with a serial terminal or a computer that is running terminal emulation software. Some common examples of terminal emulation software include Hyperterminal, ProComm, and Telix. Configuration using a direct serial connection can be performed at any time, regardless of the current ECB settings.

The Terminal Configurator can also be used over a *Telnet connection*. When using a Telnet connection, the unit communicates using TCP/IP with a computer running a Telnet program. A Telnet connection can be used to configure ECB units outside of your local area network, when the configuration utility cannot be used, because the TCP/IP communication is route-able.

Establishing a Direct Serial Connection

This method of configuring and managing an ECB uses a serial cable connected from the ECB to a computer running terminal emulation software. Hyperterminal is one of the most widely used terminal emulation programs because it is standard software included with all recent Windows-based PC's. Use the following instructions to configure your ECB using the Hyperterminal program.

1. **Complete steps 1-10 of the hardware installation procedure in Chapter 3.**
2. **Connect a serial cable to your computer's serial port. Make note of the PC's COM port you plugged this cable into. Plug the opposite end of the serial cable into the Serial port on the ECB.**
3. **On your desktop, click the *Start* icon.**
4. **Click *Programs*.**
5. **Click *Accessories*.**
6. **Click *Hyperterminal*.**
7. **Double-click the file labeled *Hypertrm.exe*.**
8. **The Connection Description screen will appear. This screen allows you to insert a connection name into the *Name* field. This name can be any alphanumeric combination.**
9. **In addition, the Connection Description screen has an *Icon field*. Leave the highlighted icon at its default setting.**
10. **Click *OK* to proceed using Hyperterminal. Use the *Cancel* button to terminate Hyperterminal.**
11. **The Phone Number screen appears next. The *Country Code, Area Code*, and *Phone Number* fields should be blank by default. Leave these fields at their default settings.**
12. **In the *Connect Using* field, choose the COM port that you plugged the RS-232 cable into from the pop-up box options.**
13. **Click *OK*. The COMx Settings screen will appear.**
14. **Select 9600 in the *Bits per second* field. Leave the default of 8 selected for the *Data Bits* field. Parity should be left at its default of *None*. The *Stop bits* setting should be left at its default of 1.**

15 **Choose *None* for the flow control option.**

NOTE: The serial port settings needed for use by the Terminal Configurator will always be exactly as described here, regardless of the General Serial Settings (Chapter 8).

16 **Click *OK* after all of the COM settings have been chosen.**

17 **The next screen will appear blank. To bring up the Configuration Utility, insert one end of an extended paper clip into the small hole labeled *Config.* (located next to the Serial port on the ECB) to push the configuration button (Figure 10).**

18 **The Terminal Configurator will appear on the screen. You have now successfully opened a direct serial connection to the Terminal Configurator!**

19 **If the ECB does not respond within a few seconds after pressing the configuration button and is connected to power, disconnect power for a few seconds, then reconnect power and press the configuration button again. If the terminal displays random characters, check the baud rate and bit settings in your terminal emulation software to insure 9600 baud, 8 data bits, no parity, and 1 stop bit.**

NOTE: If, after performing the above step, the ECB does not respond with the configuration mode main menu, verify that there is not a cable problem by observing the amber *Serial TX* LED when pressing the *Enter* key on the PC. Each time the key is pressed, the *Serial TX* light should blink faintly and quickly. If the *Serial Tx* light is not blinking, there may be a problem in the cable connection. If the *Serial TX* light blinks when the *Enter* key is pressed and the unit does not respond, check to see if the serial configuration is set to 8 data bits, no parity, 1 stop bit.

Establishing a Telnet Connection

This method will open a Telnet connection to the Terminal Configurator on port 23, which is the default for most Telnet programs. However, this only works after the ECB has been assigned a TCP/IP address. If you need to assign the ECB an IP address, you will need to use either the Configuration Utility or the Terminal Configurator using a direct serial connection.

1 **Click *Start*.**

2 **Click *Run...***

3 **Type:** `telnet xxx.xxx.xxx.xxx`
- where xxx.xxx.xxx.xxx is the IP address of the unit you wish to configure.

4 **The Terminal Configurator will appear on the screen. You have now successfully opened a Telnet connection to the Terminal Configurator.**

Using the Terminal Configurator

Once you have established a connection to the Terminal Configurator, you will see the Main menu.

1. **Once the Main menu is displayed, use the arrow keys to move the highlighted bar. If the arrow keys don not work, you can move the bar by holding down the Control key while pressing N (for *Next*) and P (for *Previous*) to move the bar. To select an entry, press the *Enter* key.**
2. **To modify the configuration, as described in the following sections, select the menu item *Edit configuration*. Another menu, listing available files to edit, will then display. Selecting one of the available files will bring up an editor that you can use to modify the file. File selection and editor operation are described below.**
3. **After you have finished configuring the ECB, select *Reset the Unit*, and then answer *Yes* to the confirmation. This will reset the device, allowing the new configuration to take effect as well as place it into operating mode. Now you are ready to use your new configuration.**

Main Menu Overview

- **Resume operation**

  This option exits Configuration. It returns the ECB to the settings the ECB had before the Configure button was pressed.
- **Edit configuration**

  Brings up a list of files to edit. Descriptions of the files and their contents are below.
- **View configuration for capture**

  If you select this option, it will give you an opportunity to enable capture mode in your terminal software. It will then display all configuration settings and give you the option to disable capture mode. This option can be used to keep a record of the settings made for a particular ECB unit, or to generate a file for 3Com Customer Support if you have any difficulties.
- **Reset configuration to default**

  Sets all configuration files to their factory default. A confirmation dialog box to verify previous selection so changes may or may not take place.
- **View forwarding database**

  Lists the MAC addresses of all network nodes detected, and the network interface of which they were last listed.
- **View roaming log**

  Lists the MAC addresses of the access points the ECB has had association/disassociation.
- **View system error log**

  Shows a list of errors if any have occurred. Use this option if the ECB Status LED is lit to see what kind of message the ECB is generating. See Section 13.2 for a list of messages.
- **Clear system error log**

  Removes all messages from the error log described above.
- **Reset the unit**

  Performs a hardware reset. Use this after making configuration changes to allow the changes to take effect.
- **Edit Configuration Menu**

  The Edit Configuration menu contains three or four selections.

- **Return to Main Menu**
  Goes back to the previous menu selections.
- **System**
  Brings up the editor screen with the configuration file for options that are not communication dependent.
- **RS-232 port (uart0)**
  Brings up the editor screen with the configuration file for the serial port and per-connection network settings.
- **Bridged Ethernet (lan0)**
  Brings up the editor screen with the configuration file for the radio parameters and IP network interface settings.

Using The Editor

Selecting one of the configuration files above will bring that file into the editor. Once inside the editor, you may use arrow keys to move the cursor around. If the arrow keys do not work with your terminal emulator, use Ctrl+P for up [previous], Ctrl+N for down [next], Ctrl+B for left [back], and Ctrl+F for right [forward] for cursor motion.

For faster motion, you can use Ctrl+A to jump to the beginning of the line, and Ctrl+E to jump to the end. (People familiar with the Emacs editor should feel at home with these keystrokes.)

To make changes in the editor, simply move the cursor to the point you want to change and type. Deleting text behind the cursor can be done by moving the cursor to the position immediately following the character to remove and press either the Backspace or Delete keys, or type Ctrl+H. To delete text in front of the cursor, press Ctrl+D. To delete text from the cursor to the end of the line, press Ctrl+K.

After editing is completed, please save these changes by pressing Ctrl+W. After the changes are saved, the Edit Configuration menu will then return to the screen. Although changes will be saved, they will not take effect until you power the ECB off and back on. If you decide that you do not want to save the changes you have made, press Ctrl+X. It will ask for confirmation, then returns to the Edit Configuration menu.

If while typing the screen display becomes corrupted or confused, press Ctrl+L to force a screen redraw. Corruptions or confusions may occur due to many terminal emulation software packages not emulating VT100 correctly.

Configuration File Format

People familiar with the Windows WIN.INI file format will recognize the format of the file. It is broken down into sections that define a particular grouping of options. Each section contains a section header at the top which is a string of text surrounded by square brackets: [ ]. This is the section title. After each section header, there is a list of entries containing equal signs. The text before the equal sign is a key and the text after the equal sign is the value. Changing the value of different keys is how configuration changes are performed. For example, here are the first two lines of the uart0 RS-232 file:

[hardware]

baud = 9600

In this example, [hardware] is the name of a section. Until the next section name in the file, all entries must be either key/value pairs (such as the "baud = 9600" entry) or comments. Key/value pairs listed before a section name are invalid.

Comments may be stored in the configuration file by inserting a pound sign (#) before the text to be added. This allows room for an explanation as to why certain settings have been made, who made the changes, etc. Anything may be written in a comment, but the comment ends at the end of the line. Multi-line comments are done by inserting the # at the beginning of each line. For example:

This is a comment.

This is line #2 of the comment.

this = no comment

But this is one.

File Contents

System

[configure]

This contains settings that pertain to the operation of the Configuration menus. Currently, there is only one: password.

- **password** This allows the setting of a password that will be asked for upon entry to the Configuration screen. Up to 12 alphanumeric characters will be accepted. Do NOT use any characters other than numbers and letters in this password. Although the password is not hidden from the screen while editing, it will be hidden when entering configuration.

[bridge]

Bridge gives variables that are common to all radios. Bridge affects the behavior of radios.

- **AP refresh period** Periodically a ECB will ping an access point. AP Refresh Period is the time, in units of seconds, between pings. The default for this value is 60 (which should be left at this default). If this default is changed, there is a chance that the access point will ignore the ECB unit; therefore, the unit will not be found on the network.

NOTE: Having this refresh period active will not hamper the performance of the ECB.

RS-232 Port (uart0)

[hardware]

RS-232 serial UART configurations found on all UARTS.

- **baud** This selects the data transfer rate of the RS-232 serial port. The baud rate can be anywhere between 112.5 and 115,200 bps. All standard rates (300, 1200, 2400, 9600, 19200, 38400, 57600, and 115200) are clocked precisely, but values in between will be rounded to the closest possible hardware setting.

NOTE: Closest possible hardware setting does not mean that the value will be rounded to one of the standard rates. The ECB's UART is fully capable of operating at non-standard speeds. The resolution of possible baud rates is smaller at lower baud rates than at higher baud rates.

- **data bits** In a UART character frame, this selects the number of bits that are used to transmit data. Possible values are 7 and 8.
- **parity** This sets the parity used in the UART character frame to check for correct data transmission. Options are none, odd, and even.
- **stop bits** Selecting the number of bits used to represent an end of character bit in the UART frame. The value can be 1 or 2.

[software]

The [software] section is used to control the receiving and sending of bytes over the serial port. Proper setting of these values can significantly enhance the efficiency of data transmission because the radio is "packet-based" and the UART is "stream-based."

Stream-based data means that the data is transmitted and received one byte at a time, without any mechanism to separate chunks of data from other chunks of data. The devices generating and using the data produced by the stream-based packet determines how the data is delimited. Additionally, the devices also determine the meaning of the packet.

Packet-based data means that the data is grouped into chunks, and then wrapper information is added to this data specifying the destination of the data. Computer networks are packet-based by design. The radio in the ECB is really a computer network interface, so the ECB's radio is packet-based.

This becomes important as the data is moved between the UART and the radio. When data is received over the radio, sending it to the UART is simple. The wrapper information is removed and the data inside the wrapper is sent out the serial port as fast as it can go. However, data being received over the serial port must be converted into packets.

In order to perform this conversion, the ECB must be given a set of rules that tell it that it is okay to start transmitting the data already received. The data cannot be transmitted as soon as it is received, because as explained earlier there is overhead in the radio transmitting process. The values in this section define these conversion rules.

NOTE: These rules do not change the data in any way. They simply specify when data can be transmitted over the radio.

- **line length** Data is transmitted over the radio once the maximum number of characters has been achieved. The line length default is 1408. Once 1408 characters have been received by the UART, these characters of data will be transmitted regardless of the content of the data. This value can range from 1 to 1408, but be cautious of using values too small for they could result in data loss.
- **input timeout** How long the ECB will wait after some data has been received on the UART before giving up on waiting for more. Once a character has been received the timer starts with this timeout. If the timer expires, the data is considered to be complete and gets transmitted immediately. Conversely, if another character is received before this timeout, the timer is restarted from the beginning. The range for this value is from 10 to 65536 milliseconds, though it will always round up to the nearest tens of milliseconds. For instance, setting the timeout to 55 will mean the ECB will wait for 60 milliseconds before giving up and transmitting the data.
- **delimiters** Special characters that specify the end of the data. Once any of the characters listed in this option are received, the data is transmitted immediately. In serial communications, there is frequently a character reserved to mean "end of transmission". In human-interface applications, this character is the "newline" or Enter key. For computer to computer communication, this value may be different. If one exists, adding it to this list will greatly improve communication efficiency. Up to four delimiters can be listed here. They are specified as a space separated list of ASCII values. The values can be written as decimal or hexadecimal numbers.
- **protocol** Data format of the communication between the UART and radio network is defined by the [protocol]. Possible values are *passthrough, passthrough2, telnet,* and *LPD*.
  - *Passthrough* forwards any data received over the UART or radio interfaces to the other interface with the data unchanged.
  - *Passthrough2* operates much like passthrough, but opens a socket in each direction so that if a ECB loses power, it can re-establish communications much faster when power returns.
  - *Telnet* gives a prompt similar to that of the Telnet application found on UNIX systems. Telnet also interprets the data received over the radio, removing special character sequences known as "DO" and "DONT" requests.
  - *LPD* is a UNIX print serving protocol. LPD received data in a particular format over the radio, and converts it into the data stream that should be sent to the printer. Data sent by the printer is ignored.

NOTE: When setting up to use LPD, set the printing parameters so that the file is sent off using the ECB as the remote host. Any remote printer name can be used so long as it fits within the guidelines for naming a printer.

[flow control]

The ECB supports the following six flow control options: Recognize RTS, Generate CTS, Recognize DTR, Generate DSR, Recognize XON/XOFF, and Generate XON/XOFF. It also supports the original RS-232 specification for flow control where CTS is generated only when RTS is asserted. These options are explained below.

The incoming flow control options specify what method of communication is used between the ECB and the device it is communicating with over the RS-232 cable to instruct the ECB when to start and stop sending data. Since the ECB is a DCE (Data Communications Equipment) device, the three methods of incoming flow control are software (also known as XON/XOFF), RTS (Request To Send), and DTR (Data Terminal Ready). These three methods are all signals that the host computer sends to the ECB when it either has too much data to work with and wants the ECB to stop sending, or when it does not have enough data and wants the ECB to start sending what it has.

Software flow control is implemented as two specific characters that are sent on the wire embedded with the data. RTS and DTR are signals that have their own wires, independent of the data wires.

The outgoing flow control options specify the method of communication that is used between the ECB and the host computer. This communication instructs the computer to start and stop sending data. The host computer is a DTE device (Data Terminal Equipment), thus uses software CTS (Clear To Send), and DSR (Data Set Ready) as its flow control signals. The aforementioned signals are sent to the host computer while its buffers fill and empty by the ECB.

Software flow control works the same outgoing as it does incoming. CTS and DSR work the same way RTS and DTR do as well.

When one communicator wants the other to stop sending data, it can use as many of the flow control options as necessary to communicate its request to the other side. Selection for software is flow control is made during the configuration.

For both incoming and outgoing flow control use the words *yes* and *no* to enable or disable recognition.

There is one additional allowed value for the CTS entry. This value is RTS. This may seem confusing, but originally the UART protocol was only defined to restrict data flow in one direction and that would be from a modem to the host computer. Originally, the modem would be allowed to send data to the host computer at any time. (The modem which does not have any buffering capabilities would loose data if the data was not sent to the host immediately; otherwise, all of the data thereafter would be lost.) The host computer, however, would have to ask permission from the modem to send data. The host would do this by asserting the RTS line. The modem would see this, and check to see if it were ready to accept data. If so, it would then assert the CTS line, thus giving it permission. Once the host computer finished sending the data, it would drop the RTS line and the modem would subsequently drop the CTS line.

This is the behavior that is emulated when RTS is used as the value for the CTS entry. Note that this is obsolete behavior, and most devices are designed for RTS to really mean flow control in the computer's direction. But the ability is there if you have older equipment. Also note, if this setting is chosen, then set the RTS entry to *no* since that line will not have the meaning of incoming flow control.

- **incoming software** Allowed values are *yes* and *no*.
- **rts** Allowed values are *yes* and *no*.
- **dtr** Allowed values are *yes* and *no*.
- **outgoing software** Allowed values are *yes* and *no*.

- **dsr** Allowed values are *yes* and *no*
- **cts** Allowed values are *yes*, *no*, and *rts*.

[i/o control]

I/O control defines control over digital inputs and outputs of the ECB, separately from the data lines. Digital input and output are shared with the flow control lines (RTS, DTR, CTS, DSR), but they are not flow control. They give the ability to send digital data from one ECB to another without interpretation by the ECBs themselves. They can also provide information to the device they are connected to about the status of low-power modes.

- **rts** Allowed values are *none* and *passthrough*.
- **dtr** Allowed values are *none* and *passthrough*.

  RTS and DTR are output lines. When set to *passthrough*, the status of these lines will be forwarded to the ECB unit specified by the "socket" option described below. When set to *none*, they do not function as digital inputs.
- **cts** Allowed values are *negate, assert*, and *passthrough*.
- **dsr** Allowed values are *negate, assert*, and *passthrough*.

  CTS and DSR are output lines. When set to *negate* or *assert*, they will output a continuous digital value. The value *negate* outputs a logic 1, or "mark" which is electrically negative. This is also the state seen on an RS-232 connector when the cable is unplugged. The value *assert* outputs a logic 0, or "space" which is electrically positive. When set to *passthrough*, CTS will output the value that the remote ECB is receiving on its RTS line, and DSR will output the remote DTR value. The source of these remote signals depends on the remote ECB's "socket" setting in this section.
- **resend interval** Ordinarily, the digital input lines are transmitted whenever they change. In some cases (such as when the remote unit is turned off and then on so that it forgets the previous output states), this is insufficient. Setting this resend interval value to a non-zero number causes the state of the input lines to be re-transmitted in a regular interval. The value of this setting is in seconds.
- **socket** This entry specifies a network connection to use to send the RTS and DTR input states to a remote ECB. The value of this setting must be the name of a section that describes the network connection to use. Also, the connection must use the RMP protocol. This is typically set to the rmpbind section.

[passthrough]

The following section specifies the operating parameters for the passthrough protocol. Currently, the only entry is socket.

- **socket** The section it specifies contains the values necessary to "bind a socket," in other words, what needs to be known to create a network connection. For example, this value by default is rmpbind. The connection used by passthrough mode will create a socket that uses the values in the [rmpbind] section further down in the file to create the network connection.

[passthrough2]

With passthrough2, there are two sockets: one for incoming data (listen), and one for outgoing data (connect). Note: Both of these sockets must use the TCP/IP protocol.

- **listen** As in the socket key for the [passthrough] section above, the value of this entry represents the name of another section that defines a network connection. This value by default is `tcpbind1a`. A later section in this file is also named `[tcpbind1a]`. Thus, the connection used by passthrough mode will create a socket that uses the values in the [tcpbind1a] section to create the network connection.
- **connect** The value of this entry points to a network connection definition that initiates the connection instead of listening for it. The default for this setting is tcpbind1b.

[telnet]

The following section specifies the operating parameters for the Telnet protocol.

- **connect** This entry dictates what kind of prompt is seen on the serial port output. The two choices available are: *wait for keystroke* and *command prompt*. The default command prompt will give a prompt `telnet>` much like Telnet software prompt on a UNIX system. From this prompt, using the "open" command will then connect the device to a particular machine. For example, typing **`open 10.10.10.129`** will open a Telnet session to the machine with the IP address 10.10.10.129. The second choice *wait for keystroke* allows for a configuration that only connects to one machine, requiring only a keypress to initiate the connection.
- **wait data 1** The text for this entry is to use as a prompt in wait for keystroke mode. The value is specified as a combination of a string and ASCII values. The default value is "*Press any key to connect to host...*" (The double-quote marks are a part of this value, unlike in previous examples.) Binary data can be added by writing data as hex or decimal, outside of quote marks. For example, the ANSI clear-screen command string (escape, left-bracket, H, escape, left-bracket, J) can be added to the front of this string like this: *0x1b* "*[H*" *0x1b* "*[J*" "*Press any key to connect to host...*"
- **wait data 2** This entry states what text to display after the keystroke is received. The format of the data is the same as in "wait data 1". The default is *0xd 0xa*, which will move the cursor to the next line.
- **ip address** When in wait for keystroke mode, this specifies the IP address of the machine to automatically connect to. The default is *10.10.10.129*.
- **tcp port** When in wait for keystroke mode, this specifies the TCP port number to connect to automatically. The default is port number is *23*.
- **reopen after shutdown** After one connection has been completed this value will appear and ask to connect again. The default is *on*.

Network Bindings

This section describes the meaning behind each of the entries that describe network binding. Five prewritten bindings are provided as examples.

[rmpbind]

This binding can be used for both the passthrough protocol and for the I/O control socket setting.

- **protocol** This example uses the RMP protocol so the value of this entry is *rmp*. RMP binding options are described below. If you wish to use the TCP/IP protocol, skip to the next example.
- **source address** This is the value that the ECB will use to identify its serial port when sending serial data to and receiving serial data from other ECB units. In short, this is its port address. The default value is *default*, which will cause the ECB to use its serial number as the address.
- **source address filter** Setting this value will tell the ECB to only accept data coming from the address specified. For example, if this entry is set to *1234*, only data originating from a ECB with the port address of *1234* will be accepted. All other data will be ignored that does not have the source address filter set to a specific address. The default value is *none*.
- **destination address** This address tells the ECB which port address to send data received from the serial port. It can be the port address of another ECB's serial port, or it can be *broadcast* or *dynamic*. Broadcast means to send the data to all of the ECB devices. Dynamic means sending the data to the ECB from which it last received data. Dynamic has the effect of causing two ECB units that are by themselves to communicate to each other. The default value is *dynamic*.
- **transmit try count** For non-broadcast data, this count specifies the number of attempts that the ECB should make in transmitting each piece of data to a remote ECB. A transmission may fail if the destination ECB is out of range or turned off. When this happens, the data will be lost if additional attempts are not made. This count gives the user the ability to tell the ECB how diligently to attempt transmission of data. The maximum count is 65,000 times. The default value is *infinite*.
- **transmit retry interval** When attempting additional transmit attempts as specified with transmit try count above, it can be useful to additionally specify how long to wait between attempts. This setting determines the time period for retransmission attempts. The value is specified in 1/100ths of a second, so that 100 means 1 second. The maximum value is 65000. The default value is *100*.

[tcpbind1a]

Four prewritten bindings, tcpbind1a, tcpbind1b, tcpbind2, and tcpbind3 are provided for TCP/IP. When protocol is set to `passthrough`, only one binding is used because only one network socket is created (tcpbind2 and tcpbind3 are passthrough binds). When protocol is set to `passthrough2`, two complimentary bindings (one connect and one listen) are used (tcpbind1a and tcpbind1b are complimentary) because a socket is created in each direction.

- **protocol** These examples use the TCP protocol, so the value of this entry is *tcp*.
- **type** The values in this entry can be either *listen* or *connect*. This specifies whether the ECB will wait for a connection from another computer or attempt to initiate the connection itself.
- **ip address** Used in TCP protocol to specify the address to which to connect. *Connect* must be selected for the IP address to be used.
- **local tcp port** This port defines the TCP port number that the ECB will wait for connections from other networked devices. *Listen* must be selected for this port to be used.

- **remote tcp port** This port specifies the TCP port numbers to connect to on the remote computer. *Connect* is the type for this port.
- **reopen after shutdown** If the type is *listen*, this value determines whether a second connection will be accepted after the first connection terminates. If the type is *connect*, this value determines whether another connection attempt will be made if the first connection is closed by the remote computer.
- **socket connect data** Data to be written to the connection once it is successful is the socket connect data. The value is specified as a combination of a string and ASCII values. For example, the default value is "*Hello!*" *0xd 0xa*. (The double-quote marks are a part of this value, unlike in some previous examples.) The item in quotes and the ASCII values together make up the data to be written. This example would cause 8 bytes to be written to the socket; these are, in hexadecimal, 0x48 0x65 0x6c 0x6c 0x6f 0x21 0x0d 0x0a. In fact, the data could have been specified on this line by using exactly those eight hexadecimal values instead of as a combination of string and hex.
- **serial connect data** The format is the same as in socket connect data. This causes data to be written to the UART once a connection is successful.
- **serial disconnect data** This causes data to be written to the UART when the network connection has been closed. This data is appended to any data already in progress. The closing of the socket will not cancel UART transmission of any data already received over the socket. The format of this data is the same as in `socket connect data`.
- **serial fail data** If the socket connection were to fail this causes data to be written to the UART. This should only happen in the case of a connect type where the remote machine was unavailable or refused the connection. However, this value may be used to catch listen problems should any software problem occur. The format is the same as in socket connect data.

Bridged Ethernet (lan0)

[hardware]

Settings for the actual ECB hardware are determined under this category. This category varies depending on the particular radio type being used. Following are some common settings that might be found for radio configuration.

- **network name** Determines the network to which the ECB device will be connecting. Alphanumeric values may be used in this field.
- **ESSID** Extended Service Set Identifier, where the service set is the wireless network to which the ECB will be connecting. Alphanumeric values may be used in this field.
- **station name** Naming of an individual ECB device (client) is done in this field. Any alphanumeric name may be used.
- **MAC address** Media Access Control, is a unique alphanumeric address that defines each node of the network. This address is predefined by the manufacturer. Valid values for this setting are: *detect save* - this will make the ECB assume the MAC address of the device on the ECB's ethernet port when the ECB is first powered on; *dynamic* - this will make the ECB assume the MAC address of the device on the ECB's Ethernet even if the device is changed; *built-in* - this will use the ECB's built-in MAC address; otherwise, a specific MAC address can be specified by typing in the 12 character MAC address without the colons (for example, to specify MAC address 01:23:45:67:89:ab, use: 0123456789ab). Note that when using the ECB for wired-to-wireless Ethernet bridging, *detect save* or *dynamic* should be used.

- **transmit rate** Data rate at which the radio transmits is set by this field. Valid values are radio dependent.
- **enable encryption** Used to indicate whether WEP encryption by the radio is desired or not. Note that if the ECB does not support setting WEP for the particular radio in use, this option will not appear. Setting of the various encryption options is done in the [encryption] section.

[encryption]

This value is the translation of data into a secret code. Presently, encryption is radio specific.

- **transmit key** This value sets which of the following keys are used to encrypt transmitted data. The default setting for this value is *1*.
- **encryption key 1** This value is one of the keys to use for encrypting and decrypting data on the radio. The key should be specified as either a 10 digit or a 26 digit hexadecimal number. Note that the number should always have a 0x before the hexadecimal digits. Use 10 digits for a 64 bit key, and 26 digits for a 128 bit key.
- **encryption key 2** This value is one of the keys to use for encrypting and decrypting data on the radio. The key should be specified as either a 10 digit or a 26 digit hexadecimal number. Note that the number should always have a 0x before the hexadecimal digits. Use 10 digits for a 64 bit key, and 26 digits for a 128 bit key.
- **encryption key 3** This value is one of the keys to use for encrypting and decrypting data on the radio. The key should be specified as either a 10 digit or a 26 digit hexadecimal number. Note that the number should always have a 0x before the hexadecimal digits. Use 10 digits for a 64 bit key, and 26 digits for a 128 bit key.
- **encryption key 4** This value is one of the keys to use for encrypting and decrypting data on the radio. The key should be specified as either a 10 digit or a 26 digit hexadecimal number. Note that the number should always have a 0x before the hexadecimal digits. Use 10 digits for a 64 bit key, and 26 digits for a 128 bit key.

[ip]

The following sections sets the configuration of the IP protocol.

- **ip address** IP address that will be used by other computers to communicate with a particular ECB.
- **netmask** When logical ANDed with the IP address, specifies the range of IP addresses within the local network.
- **broadcast** In the local network, this is the IP address that is used to refer to all computers simultaneously. The default *automatic* will work for almost all configurations. There should be no need to change this value.
- **route** For this network interface card, this value references section names that specify the routing options. The default of *automatic* will work for most configurations.
- **gateway** If present, this value specifies the IP address of your Internet router or firewall. By default, this value is set to *none*. Change this value to the IP address of your gateway if you intend to use an Internet router or firewall.

Terminal Configurator Error Codes

Table 6 Terminal Configurator Error Codes

Error Code	Description
Xxxx: [yyyy]: section does not exist	Section named yyyy in configuration file named xxxx was missing. Save your current configuration (if applicable). Reset the ECB units configuration to Factory Defaults. Reset the ECB. Restore configuration (if applicable).
Xxxx: [yyyy]: "zzzz": entry refers to non-existent section	Entry zzzz refers to a section that is not located in file xxxx. Save your current configuration (if applicable). Reset the ECB units configuration to Factory Defaults. Reset the ECB. Restore configuration (if applicable).
Xxxx: [yyyy]: "zzzz": entry does not exist	Entry zzzz in section yyyy of file xxxx was missing. Save your current configuration (if applicable). Reset the ECB units configuration to Factory Defaults. Reset the ECB. Restore configuration (if applicable).
Xxxx: [yyyy]: "zzzz": entry is invalid	Entry zzzz in section yyyy of file xxxx contains an invalid value. Check the entry in the configuration for zzzz. If you cannot find zzzz in the ECB Configuration Utility program, you may have to use the serial port or Telnet configuration menus. See Appendix A for details.
Xxxx: <[yyyy]zzzz>: Unable to add route.	Route values are out of range compared to the interface values. Set the route value to "automatic." If "automatic" does not work for your ECB, check the values you set for the route to make sure they correspond to your other IP parameters.
Xxxx: file does not exist.	Configuration file could not be found. Reset the configuration to factory defaults, and reset the ECB. If the problem persists, contact 3Com Customer Support.

B Serial Stream to Network Packet Conversion

The serial port on the 3Com ECB can be used for a range of different applications. Although the applications can be quite different, they all involve bridging data between the ECB's serial port and one of the network interfaces. Data that is received on the serial port is packetized, then transmitted on either the radio or wired network interface to the network device configured to receive serial data. This chapter will discuss the process of packetizing data received on the serial port.

Network devices transmit and receive data in a fundamentally different way than the serial port. Network devices operate on packets whereas serial devices operate on single characters. A network packet is a well-defined structure that includes enough information for the packet to be interpreted by different network devices, routed to the appropriate destination, and interpreted by the destination application. Each network packet carries some amount of application data. In the case of network packets for serial port applications, this data is the information that was received or should be transmitted on the serial port.

Data transmission between serial devices is much simpler. The most basic difference is that there is no requirement for data to be sent in well-defined packet structures. Each device sends serial data one character at a time. The other device must receive and process each character as it is received. Additionally, since serial communication is always done between only two devices, there is no need to include information about the source and destination of the data. The ECB must interpret the serial data stream, collect it into groups of data, then form network packets with this data and transmit the packet to the network device which is set to receive the serial information.

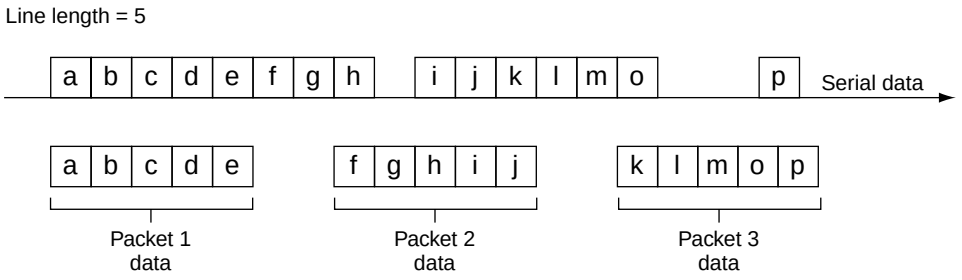
The ECB uses three user-configurable parameters to segment the serial character stream into groups of data for network packets. These parameters, line length, timeout, and delimiters, are described below. Keep in mind that the ECB always uses all three of these parameters and when the conditions of any one of them are met a network packet is generated.

Line Length

As data arrives on the serial port it is accumulated in a buffer in the ECB. The Line length parameter sets the maximum size for this buffer. When the number of characters in the buffer reaches the Line length value the entire buffer is sent as the data in a single network packet. The example below illustrates a line length of 5.The value of Line length can range from 1 to 1,408 bytes. The default value is 1,408.

NOTE: Do not use values of Line length less than 5 with a serial baud rate of 115,200 or greater.

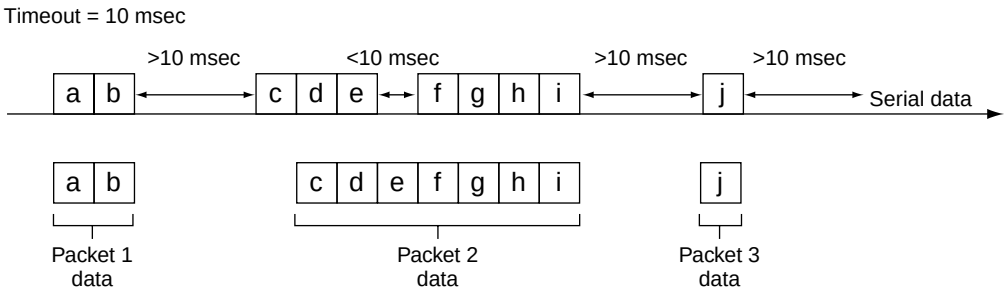
Figure 36



Timeout

Often serial data arrives in small bursts of characters. When the ECB receives a burst of data it will wait for a certain period of time for additional data to be received. If additional data is received, it is added to the receive buffer, and the ECB begins to wait again. If additional data is not received for longer than the period specified by the Timeout value, then the buffer of characters received is sent in a single network packet, and the process begins again.

Figure 37

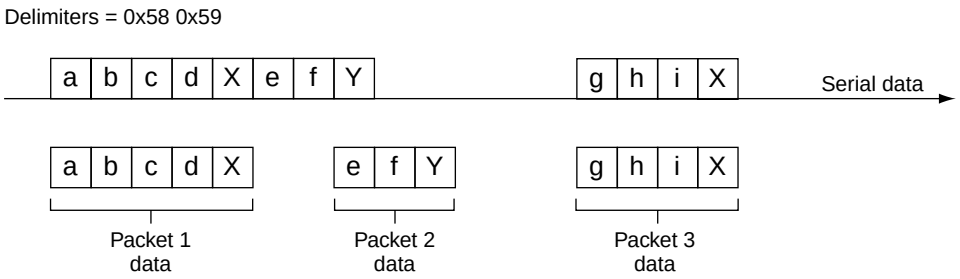


The value of timeout is in units of milliseconds, and should be specified in 10 millisecond increments. The valid range for timeout is from 10 (0.01 second) to 65,000 (650 seconds). The default value is 10.

Delimiters

Some serial devices transmit and receive data in a known structure. In these cases there are often special characters that the transmitting device uses to indicate a complete message has been sent. These characters are referred to as delimiters. You can specify up to five different delimiting characters to the ECB. When the ECB adds one of these characters to its buffer of serial received characters it will immediately send that buffer as a network packet. The example below illustrates a data stream with delimiting characters set to be "X" and "Y". Notice that the delimiter is included in the network packet data.

Figure 38

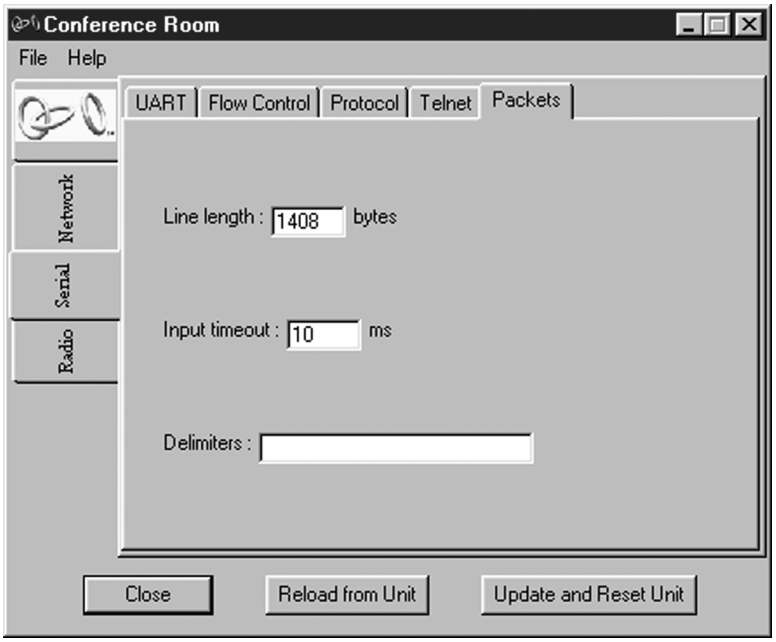


The value of delimiters is specified as a list of ASCII hex values separated by spaces. You may specify up to five different delimiter values. If you are unsure of the hex value for your delimiter character, consult the Web page www.asciitable.com for reference.

Configuration

To configure the Serial Packet parameters, click on the *Serial* tab and then select the *Packets* tab (Figure 39). Using the descriptions in this section as a guide, enter the values for Line Length, Input Timeout, and Delimiters specific to your setup.

Figure 39



C Customer Support

3Com provides easy access to technical support information through a variety of services. This appendix describes these services.

Information contained in this appendix is correct at time of publication. For the most recent information, 3Com recommends that you access the 3Com Corporation World Wide Web site.

Online Technical Services

3Com offers worldwide product support 24 hours a day, 7 days a week, through the following online systems:

- World Wide Web site
- 3Com Knowledgebase Web Services
- 3Com FTP site

World Wide Web Site

To access the latest networking information on the 3Com Corporation World Wide Web site enter this URL into your Internet browser:

`http://www.3com.com/`

This service provides access to online support information such as technical documentation and software library, as well as support options that range from technical education to maintenance and professional services.

3Com Knowledgebase Web Services

This interactive tool contains technical product information compiled by 3Com expert technical engineers around the globe. Located on the World Wide Web at **`http://knowledgebase.3com.com`**, this service gives all 3Com customers and partners complementary, round-the-clock access to technical information on most 3Com products.

3Com FTP Site

Download drivers, patches, software, and MIBs across the Internet from the 3Com public FTP site. This service is available 24 hours a day, 7 days a week.

To connect to the 3Com FTP site, enter the following information into your FTP client:

- Hostname: **`ftp.3com.com`**
- Username: **`anonymous`**
- Password: **`<your Internet e-mail address>`**

NOTE: You do not need a user name and password with Web browser software such as Netscape Navigator and Internet Explorer.

C Customer Support

Support from Your Network Supplier

If you require additional assistance, contact your network supplier. Many suppliers are authorized 3Com service partners who are qualified to provide a variety of services, including network planning, installation, hardware maintenance, application training, and support services.

When you contact your network supplier for assistance, have the following information ready:

- Product model name, part number, and serial number
- A list of system hardware and software, including revision levels
- Diagnostic error messages
- Details about recent configuration changes, if applicable

If you are unable to contact your network supplier, see the following section on how to contact 3Com.

Support from 3Com

If you are unable to obtain assistance from the 3Com online technical resources or from your network supplier, 3Com offers technical telephone support services. To find out more about your support options, call the 3Com technical telephone support phone number at the location nearest you.

When you contact 3Com for assistance, have the following information ready:

- Product model name, part number, and serial number
- A list of system hardware and software, including revision levels
- Diagnostic error messages
- Details about recent configuration changes, if applicable

Here is a list of worldwide technical telephone support numbers. These numbers are correct at the time of publication. Refer to the 3Com Web site for updated information.

Country	Telephone Number
Asia, Pacific Rim	
Australia	1 800 678 515
Hong Kong	800 933 486
India	+61 2 9937 5085 or 000800 6501111
Indonesia	001 800 61 009
Japan	03 5783 1270
Malaysia	1800 801 777
New Zealand	0800 446 398
Pakistan	+61 2 9937 5083
Philippines	1235 61 266 2602
P.R. of China	10800 61 00137 or 021 6350 1590 or 00800 0638 3266
Singapore	800 6161 463
S. Korea	82 2 3455 6455
From anywhere in S. Korea:	00798 611 2230
From Seoul:	00798 611 2230
Taiwan, R.O.C.	0080 611 261
Thailand	001 800 611 2000

Country	Telephone Number
Europe, Middle East and Africa From anywhere in these regions, call:	 +44 (0)1442 435529 phone +44 (0)1442 436722 fax
Europe and South Africa From the following countries, you may use the toll-free numbers:	
Austria	0800 297468
Belgium	0800 71429
Denmark	800 17309
Finland	0800 113153
France	0800 917959
Germany	0800 1821502
Hungary	06800 12813
Ireland	1800 553117
Israel	1800 9453794
Italy	800 8 79489
Luxembourg	0800 3625
Netherlands	0800 0227788
Norway	800 11376
Poland	00800 3111206
Portugal	0800 831416
South Africa	0800 995014
Spain	900 983125
Sweden	020 795482
Switzerland	0800 55 3072
U.K.	0800 966197
Latin America Brazil Mexico Puerto Rico Central and South America	 0800 13 3266 01 800 849CARE 800 666 5065 AT&T +800 998 2112
North America	1 800 NET 3Com (1 800 638 3266) Enterprise Customers: 1 800 876-3266

C Customer Support

Returning Products for Repair

Before you send a product directly to 3Com for repair, you must first obtain an authorization number. Products sent to 3Com without authorization numbers will be returned to the sender unopened, at the sender's expense.

To obtain an authorization number, call or fax:

Country	Telephone Number	Fax Number
Asia, Pacific Rim	+65 543 6500	+65 543 6348
Europe, South Africa, and Middle East	+31 30 6029900	+31 30 6029999
Central and South America	525 201 0075	
Argentina	0810 222 3266	
Bolivia	511 241 1691	
Brazil	0800 133266 or 55 11 5643 2700	
Caribbean	525 201 0004	
Chile	562 240 6200	
Colombia	525 201 0004	
Ecuador	525 201 0004	
Mexico	525 201 0004	
Paraguay	525 201 0004	
Peru	511 241 1691	
Uruguay	525 201 0004	
Venezuela	525 201 0004	
From the following countries, you may call the toll-free numbers; select option 2 and then option 2:		
Austria	0800 297468	
Belgium	0800 71429	
Denmark	800 17309	
Finland	0800 113153	
France	0800 917959	
Germany	0800 1821502	
Hungary	00800 12813	
Ireland	1800553117	
Israel	1800 9453794	
Italy	1678 79489	
Netherlands	0800 0227788	
Norway	800 11376	
Poland	00800 3111206	
Portugal	0800 831416	
South Africa	0800 995014	
Spain	900 983125	
Sweden	020 795482	
Switzerland	0800 55 3072	
U.K.	0800 966197	
U.S.A. and Canada	1 800 NET 3Com (1 800 638 3266) Enterprise Customers: 1 800 876 3266	1 408 326 7120 (not toll-free)

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Warranty and Software License Agreement

3Com Corporation Limited Warranty

3Com Ethernet Client Bridge

HARDWARE

3Com warrants this hardware product to be free from defects in workmanship and materials, under normal use and service, for the following length of time from the date of purchase from 3Com or its authorized reseller:

One (1) year

3Com's sole obligation under this express warranty shall be, at 3Com's option and expense, to repair the defective product or part, deliver to Customer an equivalent product or part to replace the defective item, or if neither of the two foregoing options is reasonably available, 3Com may, in its sole discretion, refund to Customer the purchase price paid for the defective product. All products that are replaced will become the property of 3Com. Replacement products may be new or reconditioned. 3Com warrants any replaced or repaired product or part for ninety (90) days from shipment, or the remainder of the initial warranty period, whichever is longer.

SOFTWARE

3Com warrants that each software program licensed from it will perform in substantial conformance to its program specifications, for a period of ninety (90) days from the date of purchase from 3Com or its authorized reseller. 3Com warrants the media containing software against failure during the warranty period. No updates are provided. 3Com's sole obligation under this express warranty shall be, at 3Com's option and expense, to refund the purchase price paid by Customer for any defective software product, or to replace any defective media with software which substantially conforms to applicable 3Com published specifications. Customer assumes responsibility for the selection of the appropriate applications program and associated reference materials. 3Com makes no warranty or representation that its software products will meet Customer's requirements or work in combination with any hardware or applications software products provided by third parties, that the operation of the software products will be uninterrupted or error free, or that all defects in the software products will be corrected. For any third party products listed in the 3Com software product documentation or specifications as being compatible, 3Com will make reasonable efforts to provide compatibility, except where the non-compatibility is caused by a "bug" or defect in the third party's product or from use of the software product not in accordance with 3Com's published specifications or user manual.

OBTAINING WARRANTY SERVICE

Customer must contact a 3Com Corporate Service Center or an Authorized 3Com Service Center within the applicable warranty period to obtain warranty service authorization. Dated proof of purchase from 3Com or its authorized reseller may be required. Products returned to 3Com's Corporate Service Center must be pre-authorized by 3Com with a Return Material Authorization (RMA) number marked on the outside of the package, and sent prepaid and packaged appropriately for safe shipment, and it is recommended that they be insured or sent by a method that provides for tracking of the package. The repaired or replaced item will be shipped to Customer, at 3Com's expense, not later than thirty (30) days after 3Com receives the defective product.

Dead- or Defective-on-Arrival. In the event a product completely fails to function or exhibits a defect in materials or workmanship within the first forty-eight (48) hours of installation but no later than thirty 30) days after the date of purchase, and this is verified by 3Com, it will be considered dead- or defective-on-arrival (DOA) and a replacement shall be provided by advance replacement. The replacement product will normally be shipped not later than three (3) business days after 3Com's verification of the DOA product, but may be delayed due to export or import procedures. When an advance replacement is provided and Customer fails to return the original product to 3Com within fifteen (15) days after shipment of the replacement, 3Com will charge Customer for the replacement product, at list price.

3Com shall not be responsible for any software, firmware, information, or memory data of Customer contained in, stored on, or integrated with any products returned to 3Com for repair, whether under warranty or not.

ADDITIONAL SERVICES

Telephone Support, with coverage for basic troubleshooting only, will be provided for 90 days, on a commercially reasonable efforts basis. Telephone support from 3Com is available from 3Com only if Customer purchased this product directly from 3Com, or if Customer's reseller is unable to provide telephone support. Please refer to the Technical Support appendix in the user guide for telephone numbers.

ninety (90) days

The 3Com *Web site* and *Knowledgebase* are available at no charge, and provide software and firmware upgrades, a bug list, and technical information about 3Com products.

Warranty and Software License Agreement

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GOVERNING LAW

This Limited Warranty shall be governed by the laws of the State of California, U.S.A. excluding its conflicts of laws principles and excluding the United Nations Convention on Contracts for the International Sale of Goods.

3Com Corporation
P.O. Box 58145
5400 Bayfront Plaza
Santa Clara, CA 95052-8145
(408) 326-5000

FCC Class B Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1 This device may not cause harmful interference, and

2 This device must accept any interference received, including interference that may cause undesired operation.

WARNING: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules, and the Canadian Department of Communications Equipment Standards entitled, "Digital Apparatus," ICES-003.These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from the one which the receiver is connected to.
- Consult the dealer or an experienced radio/TV technician for help.

The user may find the following booklet prepared by the Federal Communications Commission helpful:

The Interference Handbook

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 004-000-00345-4.

NOTE: In order to maintain compliance with the limits of a Class B digital device, 3Com requires that you use quality interface cables when connecting to this device. Changes or modifications not expressly approved by 3Com could void the user's authority to operate this equipment. Refer to the manual for specifications on cabling types.

FCC Declaration of Conformity

We declare under our sole responsibility that the

Model:	**Description:**
3CWE820A	Ethernet Client Bridge

to which this declaration relates, is in conformity with the following standards or other normative documents:

- ANSI C63.4-1992 Methods of Measurement

Federal Communications Commission 47 CFR Part 15, subpart B

Marking by the symbol CE indicates compliance of this equipment to the EMC Directive 89/336/EEC, the Low Voltage Directive 73/23/EEC amended by 93/68/EEC. Such marking is indicative that this equipment meets or exceeds the following technical standards:

EN 55022 - Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment.

EN 50082-1 - Electromagnetic compatibility - Generic immunity standard Part 1: Residential, commercial, and light industrial.

EN60950 (1992) - Safety of information technology equipment, including electrical business equipment.

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3Com End User Software License Agreement

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SEVERABILITY: In the event any provision of this Agreement is found to be invalid, illegal or unenforceable, the validity, legality and enforceability of any of the remaining provisions shall not in any way be affected or impaired and a valid, legal and enforceable provision of similar intent and economic impact shall be substituted therefor.

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Should you have any questions concerning this Agreement or if you desire to contact 3Com for any reason, please contact the 3Com subsidiary serving your country, or write: 3Com Corporation, Customer Support Information, 5400 Bayfront Plaza, Santa Clara, CA 95052

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